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The Oil Man's Calendar

APRIL	
16–17	National Petroleum Association, Cleveland, Ohio.
21–23	Southwestern Gas Measurement Short Course, Norman, Okla.
21–24	American Association of Petroleum Geologists, Denver, Colorado.
22–24	Petroleum Industry Electrical Association, Shreveport, La.
23–24	Independent Petroleum Association of America, Fort Worth, Texas.
MAY	
13–15	Natural Gasoline Association, Mayo Hotel, Tulsa.
	A.P.I. Mid-Year Meeting Canceled.
JUNE	
6	American Petroleum Institute, Illinois Basin Chapter, Robinson, Illinois.
6	Illinois-Indiana Petroleum Association, Robinson, Illinois.
OCT.	
8–10	Texas Mid-Continent Oil & Gas Association, Dallas.
12	National Stripper Well Association, Wichita, Kansas.
13–15	Independent Petroleum Association of America, Wichita, Kansas.
NOV.	
9–13	American Petroleum Institute, Chicago.

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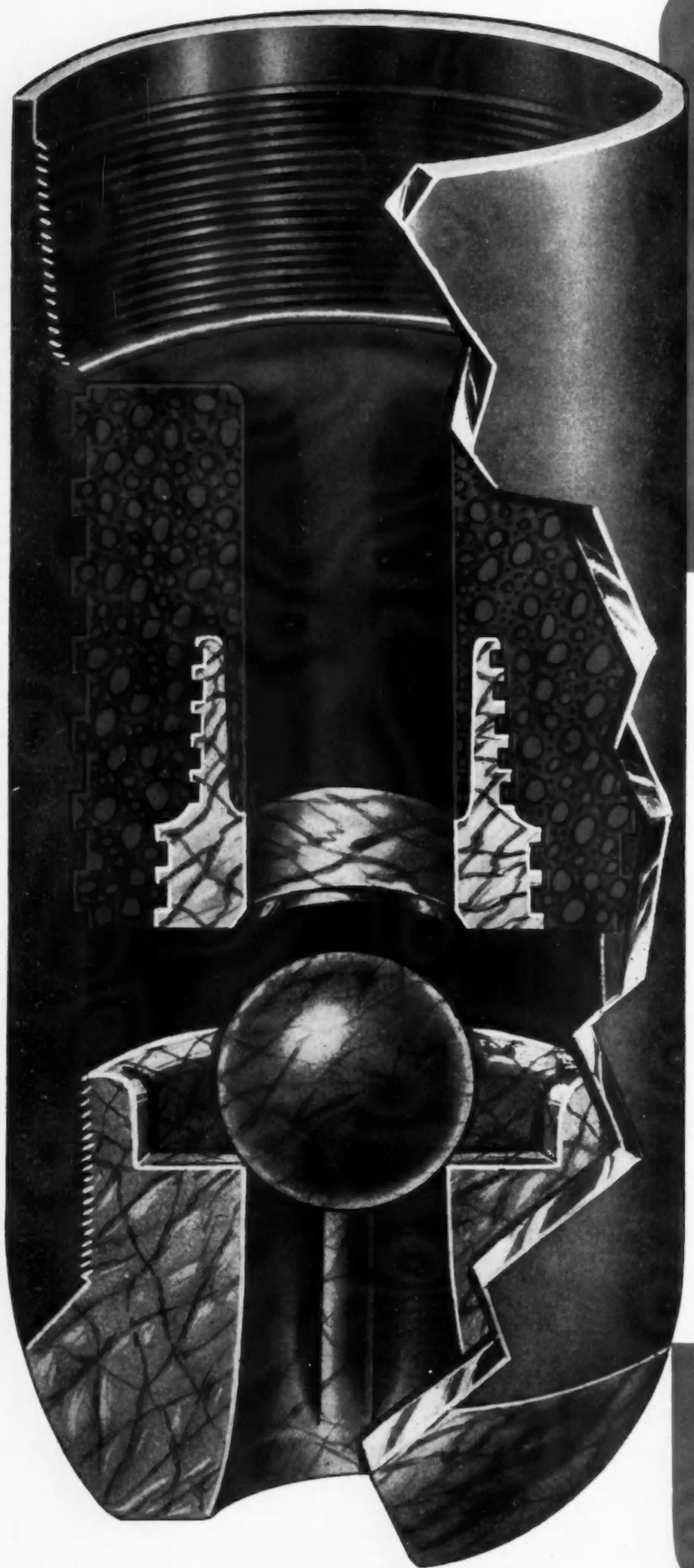

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The Changing Panorama

Cut Down Duplication and Get the Job Done

FACED with prospects for reduced personnel, scarcity of operating materials, tires and cars, the industry must devise means of conducting its field operations under these new difficulties.

In the past, the industry has hesitated to unitize, consolidate or group its field operations, but reduction of duplicated efforts appears the most promising solution to current problems. Some sound practical suggestions were given by L. F. McCollum, youngish president of The Carter Oil Company, in an address before the recent Mid-Continent API meeting. His views are worth repeating.

Frequently three companies operate in the same three fields, and in each field each operator maintains a foreman, two sub-foremen, five roustabouts and 12 pumpers. A total of three foremen, six sub-foremen, 15 roustabouts and 36 pumpers in the same three fields. "Why shouldn't these operators trade their properties on an equitable basis or perhaps make some farm-out or exchange arrangement, so that one company would operate one of the fields, another the second field and the third the other field?" inquired McCollum. Think of the savings in man-power, equipment, car mileage and the increased efficiency of operations which could be effected.

Two companies operate two gasoline plants a few miles apart in the same field, neither at capacity. Either plant can process all the gas from the area. "Let's not rob armament channels of materials to build a third plant in another pool. Let's consolidate these operations and move the excess plant to the new location," suggested McCollum.

A number of companies in a single pool maintain pulling units, equipment and personnel for well servicing. In most cases this equipment and personnel are not used at 100 percent efficiency. "Would it not be possible for companies in various districts to pool such equipment for cooperative well-servicing work, thereby conserving essential materials and releasing man-power for use where needed more urgently?" he asked.

In Oklahoma 39 scouts for 17 principal companies, driving 39 automobiles scour over-lapping territories wearing out 156 tires and tubes, to gather data from 315 drilling operations, the majority of which could be obtained on an exchange basis. The same situation prevails throughout other states. "A central clearing house to which each company daily supplies the pertinent information on its drilling wells to be condensed into one scouting report for all participating companies," would, McCollum pointed out, "release as many as 30 men and their cars.

Here is something worth thinking about.

A total of 262,544 gallons of toluol has been seized by WPB since last December, and an additional 41 tons of toluol has been acquired in voluntary sales by owners. All the materials had been purchased before the outbreak of war for export to enemy or occupied countries, or for other reasons.

East Coast Dilemma

DUE to necessity of moving larger quantities of fuel oil to East Coast war plants and for naval operations, movement of gasoline into that territory may slacken. Thus more stringent rationing of gasoline to civilians is in the cards. Last week new limitations reduced quotas to 33-1/3 percent below normal, and may be cut further. But coupon rationing does not appear probable before June or July, because a plan has as yet not been decided upon and considerable time will be required thereafter before it could be placed in operation.

Drilling and production rates have declined sharply, but geophysical prospecting activity has increased substantially during the first two months of the year. A checkup with major companies show that leasing also has continued at normal rates thus far.

Tax Bill Not Expected to Change Depletion

FINAL passage by Congress of tax legislation now being considered is not expected before fall, and is likely to take an entirely different course than that recommended by the Treasury Department.

Members of Congress appear in no hurry to pass the legislation, although the Treasury is anxious for its enactment because of excise tax provision which would bring in some $10,000,000 monthly as soon as the measure becomes law. Delay in handling the bill is attributed to a desire in Congress to explore thoroughly the possibilities of a general sales tax as an alternative to steep increases in income rates, and members are also mindful that there will be an election next November and that taxes will play an important part in the antecedent campaigns.

When the Ways and Means Committee does get around to writing the bill, members predict that most of the Treasury recommendations will be rejected. Among the proposals expected to be thrown out is that for revision of the depletion allowance, members being afraid that to tinker with it might interfere with maximum oil production which the administration is seeking to develop.

Oil Can Easily Meet Ethyl Alcohol Demand

A TENTATIVE War Production Board estimate says an additional 20,000,000 gallons of ethyl alcohol synthesized from natural gas may be wanted this year. It would not be much of a burden. The oil industry could make it (is making some at present) either from natural gas or cracked gases. Natural gas is cracked to produce ethylene, or ethylene can be fractionated as such from refinery cracked gases. Ethylene treated with sulphuric acid produces ethyl

sulphate, which changes into ethyl alcohol when mixed with water.

Excluding processing losses, 110 tons per day of ethylene would be needed to make 20,000,000 gallons of alcohol per year. Just how much natural gas would have to be cracked to produce this much ethylene depends on the cracking method used, but in 1940 the natural gas industry produced about 39,000 tons per day of ethane, which would yield the required ethylene and much to spare. A big combination crude cracking unit in Texas yields 0.5 weight percent of by-product ethylene based on the crude charge. At this rate of production, the 20,000,000 gallons of alcohol could be made purely as a by-product from the ethylene resulting from the running of 155,000 barrels of crude per day, which is only 4 percent of daily refinery crude runs.

WPB's move to stop the output of consumers' durable goods, prompted by shortage of steel plate for ship construction, 100-octane gasoline plants and synthetic-rubber projects, will fall heavily upon most oil country operations, prime users of heavier types of equipment. Donald Nelson, War Production Director, in commenting on the impending order, said: "The next two or three months will be a period of difficult adjustment for the nation in general and the industrial producers and employes engaged in the operations which are restricted."

Don't Violate Orders!

WILLFUL violations of WPB conservation or OPA rationing orders and regulations will be subjected to heavy penalties under the provisions of the Second War Powers Act, recently signed by President Roosevelt. Chiefs of both WPB and OPA have warned that a maximum penalty of $10,000 fine and imprisonment for one year is provided in the act for violation of their orders. Both parties to a violation, purchaser as well as seller, may be prosecuted. OPA has adopted a comprehensive plan for investigation and criminal prosecution of persons who flout priority or rationing rules, and WPB is expected to follow suit.

Paper Work Wasting Many, Many Hours

IN STREAMLINING operations to eliminate lost motion and to direct all possible effort to the one vital task of producing implements of war, as recently called for by Donald M. Nelson, WPB director, close scrutiny should be given to the possibility of reducing the amount of "paper" work required in putting through orders for essential materials. Literally millions of man hours must be spent in this non-productive work.

A typical example of this excessive paper work, one that is being duplicated in many lines of business, is a recent order placed for 700 pounds of arc welding electrodes that had a total selling price, exclusive of freight, $40.90.

The order occupied a single sheet of paper, but was accompanied by 199 priorities, each of which consisted of 3 sheets or a total of 597 separate sheets of paper, all requiring typed fill-ins. In addition, each of the 199 priorities required two signatures, one by notary, evidenced by notary seal.

Complaint of the time killed involved in government required "paper work" is almost universal.

W. A. Dewald, order department, and J. F. Lincoln, president, The Lincoln Electric Company, examine 5¼ pounds of priority extensions which accompanied a recent order for 700 pounds of arc welding electrodes, which are shown in the 14 standard containers each holding 50 pounds of electrodes.

In the case of the larger manufacturing companies complete departments have been created to handle the work. In the case of smaller concerns executives, whose time already is limited, are forced to do "paper work" when their time could be better employed in directing production.

One owner of a Pennsylvania manufacturing plant showed us the "paper work" necessary in ordering 100,000 pounds of alloy steel to be used in a government job. The file he had was about an inch and a half thick. "And remember," he said, "these are only my copies. The carbons we had to make would run the amount of paper up several times what you see here.

"The most important problem facing business," he continued, "is the curtailment of the ability of management to fully function as a directing force of accomplishment. This is due to the time demanded of it in operating under burdensome, complicated and un-needed regulations, as well as collecting and making available volumes of irrelevant information."

Burma's Rich Fields?

NEWSPAPER reports are making considerable ado over the fact that Japanese forces are now threatening "the rich oil fields of Burma." Actually these are comparatively small producing regions, having an annual yield slightly less than 8 million barrels. Neighboring British India fields produce another 2¼ million barrels yearly, a total of little more than 10 million barrels annually. In contrast, conquered Dutch East Indies and British Borneo produce 68½ million barrels per year, or nearly seven times as much.

Sectionalized rationing of gasoline, as now applied only to the East Coast and Northwestern Pacific, could easily lead to "border" wars, with stations in adjoining unrestricted regions taking advantage of their more unfortunate neighboring competitors. It is reported that a 50-mile "no-man's land" is being considered between districts where cars with licenses from restricted states can not purchase gasoline.

WASHINGTON ROUNDUP

By B. F. LINZ
Washington Correspondent

THE East Coast situation and synthetic rubber were the principal subjects of discussion in Washington oil circles last week as the Industry War Council, gathering for its April meeting, forwarded to Coordinator Harold L. Ickes specific suggestions on both submitted by its various committees.

See Page 14 for Details on PIWC Meeting

Featuring the council sessions, the committees on petroleum economic and on transportation submitted reports analyzing the shipping situation and making specific recommendations for rationing without further delay, for construction of more tankers and for creation of a pipe line network to feed oil to the East.

Containing detailed information on tankers diverted, sunk and constructed, the reports were suppressed and only such sections as carried no information of aid or comfort to the enemy were disclosed.

At the same time, the council, on its own initiative, urged the government to give financial assistance and priority for materials for the construction of plants wherein 300,000 tons a year of synthetic rubber would be produced for civilian consumption, as a means of keeping the country's automobiles on the road and the industry on an even keel.

The only limiting factor in the expansion of the rubber program, so as to meet a large share of civilian requirements in addition to military needs, it was pointed out, is the release of the steel and money necessary to that objective.

Rubber also received attention at the capitol, where Secretary of Commerce Jesse Jones denied there had been any delay in putting the government's rubber program into effect once differences of opinion as to the desirable extent of synthetic production had been settled.

PIWC Report Features Busy Washington Week

Ickes Anxious to Avoid Card Rationing of Gasoline

Synthetic Rubber Under Fire in Many Quarters

With the supply situation showing no signs of improvement, Coordinator Ickes ordered a reduction of 25 percent in deliveries of home heating oils and, effective April 16, an increase to 33-1/3 percent in the reduction on deliveries of gasoline, while the Office of Price Administration revealed plans for card rationing had encountered difficulties which would probably prevent its application before summer.

Representatives of the state regulatory bodies will meet with OPC officials April 14 for the first meeting of the council which was formed some weeks ago. The discussions are expected to center around the difficulties of production under the restricted consumption now permitted, as evidenced, among other developments, by the 18 days of shutdowns which are being imposed in Texas this month.

Ickes Says Gasoline Outlet Important

Further curtailment of gasoline deliveries will be ordered effective April 16, making a total reduction of one third, which may make it possible to avoid card rationing, which is "unsatisfactory, expensive and cumbersome," Ickes said last week.

Present restrictions are working out "surprisingly well although it is probable the public hasn't yet felt the pinch — but it will in a week," he said.

"East Coast stocks reached a new low on April 4, 13,275,000 barrels under a year ago. Major problem is heavy-fuel oil. Supplies are adequate for about 11 days, which is nearly normal. But deliveries are always on a hand-to-mouth basis and day-to-day stocks depend on transportation.

"Conversion from oil to coal will save about 20,000,000 barrels a year. Conversions already reported will account for about 6,000,000 barrels and others promised will make up the difference.

"Not much chance for the Texas-New York pipe line; emphasis now is being laid on construction of short stretches to link up some of the existing lines. Considerable progress being made, and there may be a report soon. Not especially enthusiastic over proposals to dig up and relay any lines.

Rationing is subject of much thought. OPC doesn't favor national curtailment "just for the sake of rationing."

"It is terribly important for the oil industry to have as normal an outlet for its products as possible. That is especially true with respect to gasoline, because that is where the tire question comes in; if all the cars go off the road for lack of rubber they won't have a normal market or anywhere near a normal market for gasoline, and unless they can refine gasoline they won't have the products for synthetic rubber or 100-octane."

Dumping of excess gasoline back into the ground would add greatly to the cost of aviation gasoline and synthetic rubber.

"The strain on the economy of

the country would be enormous; that is another reason why we do not want to have to cut off the sale of gasoline unnecessarily."

Tank car deliveries to the Seaboard area reached a new high of 524,700 barrels a day during the week ended April 4, involving the use of 19,000 cars, but the railroads now doubt whether any further great increases can be made. Particularly affected are the routes into New England; little possibility that the additional production allowed Michigan for New England delivery can all be transported.

Bill Would Control Cartel Arrangements

Following last week's disclosures of Standard Oil Company of New Jersey relations with now-enemy countries, Senator Joseph C. O'Mahoney of Wyoming this week introduced a revised version of his bill for federal control of corporations, with provisions requiring every American corporation to file notice of any cartel arrangement with foreign countries.

The bill carries many of the provisions of O'Mahoney's original legislation, including a prohibition against any corporation director having an interest in a competing corporation or in any corporation with which his company does business; a requirement that all directors shall have an actual bona fide financial interest in their corporations; and that reports be made to stockholders of all transactions of directors in the securities of their companies.

It is also provided that a copy of any general plan or program with any foreign corporation or foreign national, directly or indirectly, and with any corporation or person controlled by any foreign corporation or nation, to effect the exchange or transfer of property, franchises or other rights, including patents or licenses, through purchase, assignment, lease or sale or otherwise, shall be filed with the Department of Justice.

Under the bill, directors would be individually liable to the corporation for any damage caused to the corporate estate through the violation by the corporation of any federal law, which violation was authorized, ordered or done by such directors.

Approves Suspension Of Anti-Trust Laws

Department of Justice approval of legislation which would permit suspension of the anti-trust laws with respect to industry programs undertaken at the request or order of government agencies was expressed this week by Attorney General Francis Biddle.

The department's position was made known by Chairman Van Nuys of the Senate Judiciary Committee, in charge of the legislation, following a secret conference at which the committee and Biddle discussed the measure.

The legislation would give statutory immunity to violation of the anti-trust laws for acts or omissions requested by the government and certified by the chairman of the War Production Board as necessary to the war program.

So far, industries carrying out the programs of the war agencies, including the oil industry's cooperation in activities laid out by the Office of Petroleum Coordinator, are safeguarded against prosecution for possible violations of law only by correspondence between OPC and the Department of Justice, in which the former outlines what is planned to be done and the latter gives the plan approval and clearance.

Senate Committee to Investigate Patents

The Senate Patents Committee on April 13 will open an exhaustive investigation of patents covering processes and products needed in the war effort with a view to determining the position to be taken on legislation authorizing the compulsory licensing of such patents for the duration of the emergency.

Possibilities that the inquiry might extend to the field of oil were seen in a statement by Chairman Homer T. Bone of Washington that aviation gasoline pumps, synthetic rubber and a number of chemical processes would be among the subjects covered, that the Interior Department will be among the federal agencies which will present testimony on the effect of patents on production, and that Standard Oil Company of New Jersey and its subsidiaries are included in a list of concerns which have been subpoenaed to produce pertinent documents for the consideration of the committee.

Bone disclosed that since March 30 subpoenaes have been out for the files of the anti-trust division of the Department of Justice relating to the various products which are to be investigated.

Jones Answers Charges On Rubber Situation

A picture of conflict and difference of opinion over the synthetic rubber program which should be adopted prior to our entrance into the war was given the Senate committee investigating defense last week by Secretary of Commerce Jesse Jones.

"Until I read Mr. Batt's testimony before your committee, I thought we were following his and Mr. Stettinius' recommendation in the experimental synthetic rubber program," Jones said plaintively as he began his testimony that the National Defense Council itself was not in agreement on what to do or how to do it.

Jones submitted a formal answer to 32 questions propounded by Hugh Fulton, general counsel of the committee, in which he showed that plants with a yearly capacity of 40,000 tons of synthetic will be in operation before the end of this year.

His response to these questions disclosed that originally synthetic rubber manufacturers were to pay Standard Oil Development Company a royalty of 7 percent, but not over 7.5 cents per pound, on all Buna-N rubber and on Buna-S rubber used for other purposes than the manufacture of tires and tubes, but that the recently-consummated agreement for the pooling of all patents provides that the company is to be paid a 1 percent royalty for 5 years and 2 percent for the next 5 years, with payments to terminate in 1951.

Asked specifically "was the synthetic rubber program in part dependent on the 100-octane gasoline programs, and if so, were any delays due to action or failure to act by the Office of the Petroleum Coordinator?" Jones said:

"The synthetic rubber program

can be developed independently of the 100-octane gasoline program. However, the same raw materials are being used in both programs and there is an abundant supply of such materials. There were no delays in this program."

Legislation Proposed For U. S. Rubber Group

Legislation for creation and financing of a United States rubber authority to construct plants for the production of 400,000 tons of synthetic rubber a year was introduced in Senate and House April 9 following attacks on the administration's delay in getting into production of this vitally important commodity.

Hitting at the administration in the House, Representative Woodruff of Michigan asserted "there is something very peculiar about the synthetic rubber situation in the United States."

"Washington," he said, "has been filled with rumors and whisperings about the manipulation which was indulged in to prevent the establishment of a synthetic rubber industry in the United States."

The bill for government manufacture of rubber was introduced by Senator Murray of Montana and Congressman Beiter of New York. It would provide a capital of $100,000,000 to start operations and stipulated that the plants be placed at decentralized locations, adjacent to the sources of raw materials.

Standard Was Ready on Rubber Two Years Ago

Meanwhile it was disclosed last week that Standard Oil Company of New Jersey was prepared to get into synthetic rubber manufacture two years ago.

An answer to charges by Assistant Attorney General Thurman Arnold that Standard withheld information on its butyl rubber process from American industry because of its cartel tie-up with I. G. Farben Industries was found in the long-forgotten transcript of hearings held by the Senate military affairs committee in June, 1940.

Testifying in that hearing, W. S. Farish, president of the company, revealed that Standard had furnished the Firestone Company and United States Rubber Company with sufficiently large samples of butyl rubber to permit experiments to determine the practical uses to which it could be put. He did not, however, reveal the tenor of the companies' reports on the synthetic.

"In an emergency, if we are shut off from raw materials supplies, if the industry jointly—I mean the petroleum industry as well as the rubber industry—were put to it and told to go ahead with adequate financing to do the job, in a reasonable period of time, we think we can make all the synthetic rubber that we can use in this country," he said.

"We do not think there is any doubt but what the industry, as I told you, the petroleum industry, cooperating fully with the rubber industry, could develop in a reasonable time all the synthetic rubber that could be used, whether it is butyl or buna, either one or both."

Farish calculated that the cost of a 300-ton-a-day plant would range from $25,000,000 to $50,000,000 and that within two or three years time a production of 1000 to 1500 tons of synthetic rubber a day could be built up.

He told the committee there were two ways in which the problem could be approached, one a direct subsidy from the government in the shape of orders to go ahead and make the rubber, the other the method followed in some European countries of requiring consumers of natural rubber to buy a stated percentage of synthetic. The latter would influence rubber manufacturers to develop ways of using the synthetic and "that would leave the field of production wide open as to competition as to who would get the sale of that indigenous product, and in that way you would encourage the production of domestic, synthetic rubber.

"Whether that is worth anything in this emergency that you are facing or not, I do not know, but certainly it is worthy of consideration if you go into some emergency production of synthetic rubber."

Amended Price Schedule Clarifies Situation

Provisions of the petroleum price schedule (No. 88) were amended by the Office of Price Administration, effective April 9, to establish a method of setting uniform maximum prices for crude in pools where new wells have been opened or old wells reopened since October 1, last.

The original price schedule provided that where there was no purchase price posted as of October 1 for the pool in which a well completed or reopened after that date is located, a purchaser might set a temporary price, provided the price and a description of the crude were reported to OPA within 10 days.

The amendment provides that such temporary prices now shall be subject to disapproval by OPA, but if the temporary price is a posted price it shall, unless disapproved by OPA, be the maximum price at the well for oil produced from any wells located in the pool in which the new or reopened well is situated. The provision also covers wells representing discovery and development of new pools since October 1, 1941.

Further Cut in Heating Oil Deliveries Made

Deliveries of heating oils were cut 25 percent in all areas in District 1 and Washington and Oregon this week as a further move to conserve needed transportation space for industrial oils.

Despite the fact that Secretary of the Navy Knox reported that only one tanker was sunk off the United States coast last week, the supply situation continued to tighten. The curtailment order was issued by OPC as Recommendation No. 39 at the suggestion of the District 1 marketing committee.

Meanwhile, it was learned during the week that the Maritime Commission is giving consideration to construction of 85 more concrete barges, some to be equipped with Diesel engines and some to be used for oil transportation. A method of oil-proofing such barges with the use of creosote will make possible their use for oil, it was said.

The commission has 15 concrete

[*Continued on page 43*]

War Council Maps Program to Relieve Oil Crisis

By B. F. LINZ, Washington Correspondent

A DEFINITE program of rationing, pipe line expansion and tanker construction and proposals for a government-financed rubber development, designed to meet the challenge of the East Coast oil shortage and the nation's need for rubber, was presented to the Industry War Council at its April meeting last week.

At least 10 new pipe lines were proposed by the council's committee on transportation, which joined with the committee on petroleum economics in recommending immediate rationing of gasoline. As a means of keeping the industry's gasoline moving, the council also outlined plans for the production of 300,000 tons of synthetic rubber a year for civilian consumption, to be in addition to the 700,000 tons which Secretary of Commerce Jesse Jones has programmed to meet military needs.

Asks for Rationing

Although the two committees called for immediate gasoline rationing, as a means of temporary relief pending the provision of additional transportation facilities, Dr. Joel Dean, in charge of the gasoline rationing program of the Office of Price Administration, disclosed that this could not be done, but that unexpected difficulties have been encountered which make rationing unlikely before summer.

Among the subjects still to be acted upon, it was said, are whether rationing shall be applied only to the shortage states or made general, and what distinction in allowables, if any, shall be made between the motorist wanting gasoline for vacation driving and the car owner who uses it for transportation to his work or in connection with his business.

Meeting with the council also was J. S. Knowlson, director of industry operations for the War Production Board, who discussed the materials situation as applied to development and other activities of the industry. In their reports on the supply situation, the two committees minced no words in depicting the serious conditions which now prevail and will continue to exist, in all probability for many months to come.

Possible diversion of "virtually all" of the industry's tankers by the end of this year was foreseen by the committee on petroleum economics.

$200,000,000 for Lines

Contents of the transportation committee's report were not made public pending a decision by OPC as to what action should be taken on its recommendations, but it was disclosed that it called for the construction of more than $200,000,000 of new pipe lines to carry oil from the producing areas to the Middle West and East. The committee's ten-point program called for the construction of lines with both new and used pipe, the building of loops to connect present lines and the building up of the capacity of existing facilities.

Reporting through Chairman W. Alton Jones, president of Cities Service Company, the committee was said to have again discussed the Texas-New York line but to have laid more stress on a line from Texas to Illinois as the major feature of the proposed network. Revealing in detail the dent in tanker facilities made by diversions and losses, Dr. Robert E. Wilson, president of Pan-American Petroleum and Transport Company, reporting as chairman of the committee on petroleum economics, disclosed that a good start has been made toward offsetting these losses by new tankers coming into service under the Maritime Commission program, whose speed and capacity makes each the equal of two old-type oil carriers.

Before adjourning the council adopted the committee's report on the motion of B. L. Majewski of Chicago, who said that "On behalf of the general committee in District 2, I wish to commend the committee heartily for its fine contribution to the war effort in the form of guideposts the several government agencies and the petroleum industry should follow." But he added, "It should be understood that rationing in each district is not to become effective until OPC takes action after receiving and considering each district's recommendation."

The report figured that supplies to the East Coast may be expected to include 600,000 barrels a day moving by tank car, 105,000 barrels by pipe lines and 67,000 barrels by barge, but even with these aids, it was said, supplies will be 24 percent under the necessary minimum.

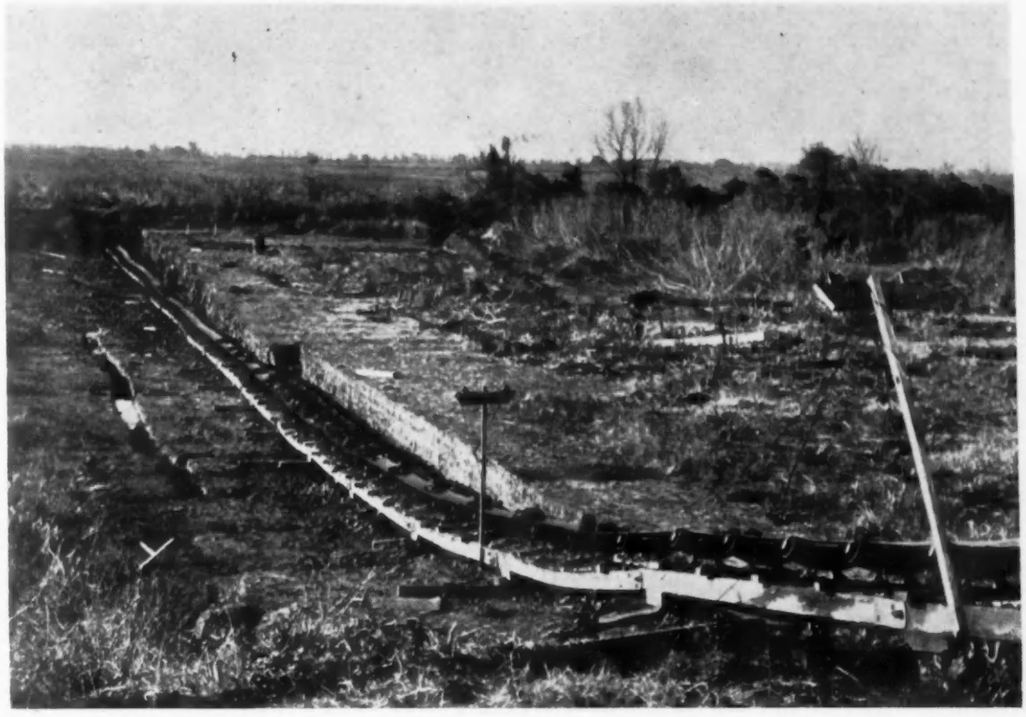
The committee placed the needed minimum working stock levels on the seaboard at approximately 10,000,000 barrels under those of a year ago, placing the minimum at the close of this quarter at 57,000,000 barrels, 72,000,000 barrels at the close of the third quarter and 67,000,000 barrels at the end of the year. At the end of 1941, stocks were 77,000,000 barrels. Stocks on March 21 were 50,700,000 barrels, or 12,400,000 barrels under the corresponding date last year and, the committee commented, "continue to be dangerously low even for peace time."

Reason for General Rationing

It was explained that the 24 percent deficiency in the seaboard area reflects the concentration there of the overall shortage for the western hemisphere. If rationing is applied only to areas dependent on tankers, the shortage on the East Coast would be 124,000 barrels daily, or 10 percent of the 1,300,000-barrel essential East Coast demand, but if it is applied to the interior area also the East Coast shortage then reflected would be reduced to 44,000 barrels, or about four percent of minimum demand.

"The reason that the rationing

[*Continued on page 43*]



A 400-foot conveyor belt carries mud from excavation to mixing plant. End of conveyor is moved as digging progresses, to facilitate placing mud on belt. Men with shovels place mud on belt for moving to mixing machine. Mud excavation pit is deeper at one corner to facilitate drainage.

Central Mud Plant

Provides Drilling Fluid for Marine Locations

By GORDON B. NICHOLSON
Staff Writer

IN MARINE locations, often isolated and where procuring fresh water is costly and inconvenient, mud requirements are effectively supplied for The Texas Company by output from a mud plant and storage system located in a central site and furnishing incidental mud requirements of rigs drilling in waters of the bays and inlets of the region. Special barges deliver mud of specified weight and viscosity to rigs, relieving drilling crews of mixing, as well as eliminating expense of providing fresh water supplies and special mud storing installations on drilling barges.

The plant is located at the warehouse and terminal in Montegut, Terrebonne Parish, South Louisiana, which is the central operating point for the company in the Houma District. Reserves of ready-mixed mud are stored in tanks near the plant, and provide ample supply for several company-owned drilling barges which are active in marine fields in the area. Centralized storage facilities serve a dual purpose, often saving waste when wells are completed and costly chemical muds are left in the slush pits, by facilitating transfer of mud into barges which bring it to the Montegut terminal for storage.

Products of the plant consist of lighter muds or clays, used in drilling shallow or low-pressure wells. Chemical and specialized muds are mixed on drilling barges as conditions warrant, and all barges are equipped for mixing and storing such muds when needed. Light drilling fluids made of native clays and having characteristics adaptable for ordinary conditions, however, are stored in the terminal and have a widespread use. Mobility of mud-delivery barges allows rapid movement to rigs where mud is shipped, and appropriate pumps for emptying tanks, moving mud to barges, and transferring it to drilling barges are provided.

On the west bank of Bayou Chien are located the mud excavation pit, plant, and storage facilities, in addition to docks and loading devices for removing mud from tanks to barges. The mud pit comprises an elongated shallow excavation which has been gradually deepened as mud was removed. A conveying system about 400 feet long and including an endless belt serves the pit, extending into the pit to its lower extremity and terminating at the upper end near the mud grinding mechanism. The excavation is dug at a slope to facilitate drainage, with one corner forming the lowest point. Across the pit at intervals, shallow drainage ditches are cut for carrying water to the low corner, where a small pump is placed at ground level to pick up water as it accumulates.

The 400-foot conveyor includes a belt 14 inches wide and ¼-inch thick, provided with rollers both above and below to hold the device

off the mud and to allow unrestricted turning. Several workers equipped with shovels stand alongside the conveyor, digging mud and placing loads on the moving belt which carries it to the receiving device at the upper end of the system. The conveyor is erected on a wooden track made of a frame of 2 x 4 lumber. The frame is mounted on short blocks, and as digging progresses to untouched sections of the pit, the track is skidded by forcing with bars, to move into a position accessible for workers. Excavation continues from one level extending width of the pit; then path is reversed and mud is removed from a lower level. Mud will be obtained from the present pit until sand is reached and texture of the soil becomes unfavorable for making drilling fluids.

Blades Reduce Mud Into Small Pieces

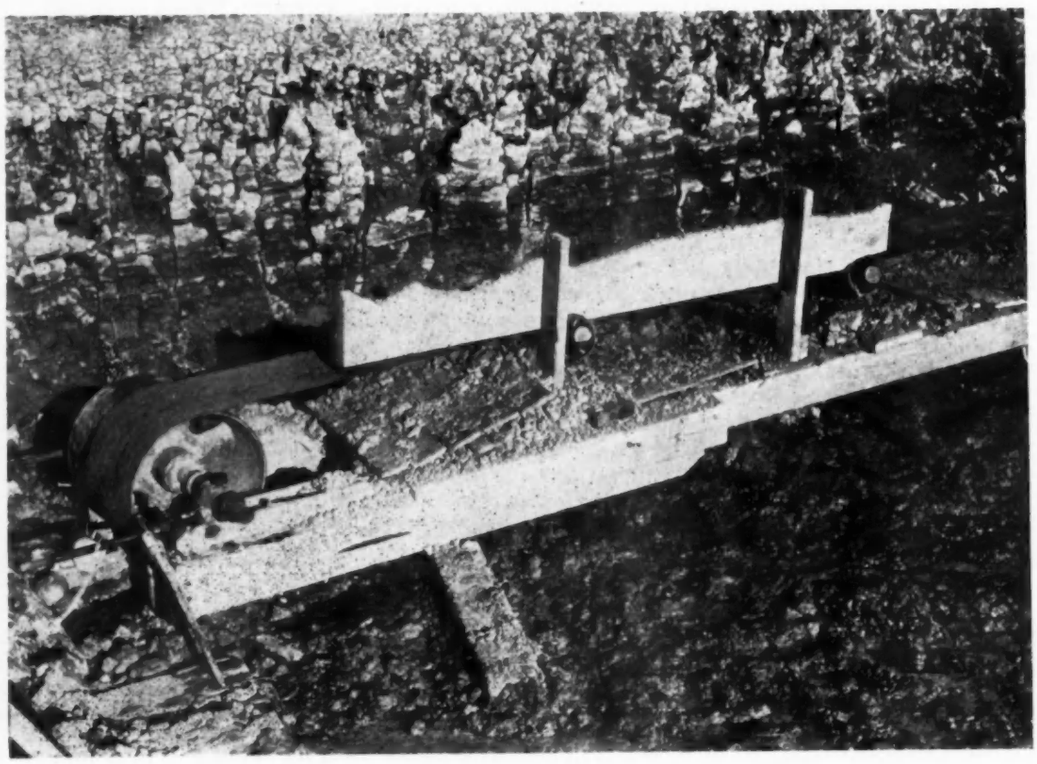
Mud-processing apparatus includes principally the prime mover, cutters, strainers, and two pumps for jetting, mixing, and delivery to storage tanks. Lumps of mud dug from the pit and placed on conveyor are dumped into cutting machinery at top of the belt. At this end of the system is located power apparatus which, in addition to cutting mud, also motivates belt. A 20-horsepower gasoline engine drives the mechanism, and by means of a beveled gear at the top, rotates the wheel on which conveyor operates. Another set of beveled gears at the bottom turns drive shaft and blades which, in rotating, cut the mud as it empties into the mixing box. A belt connected with this shaft also propels two pumps located nearby.

As mud reaches the end of the trip by conveyor belt, it is first dumped into the mixing box, where rotating blades cut it into small particles, augmented by cutting action of jets, of water directed on the mud from two sides. Inside the mixing box, mud is thoroughly cut into small bits by the whirling blades. These blades, connected directly with the engine, turn slowly, but allow only small clearance between the curved bottom of the box. Water for the jets is supplied by a 3-inch line fed by a water well, and the first of the nearby pumps provides jetting power which forces a strong stream of water into the mixing chamber, directing flow of, and effectively cutting, the raw mud. Water from the jets is also instrumental in breaking down and mixing the mud, and it also flushes cuttings into discharge line and thence over screens for separation of large particles from the mud fluid. The jet pump also forces water into a small tank for cooling the engine circulatory system.

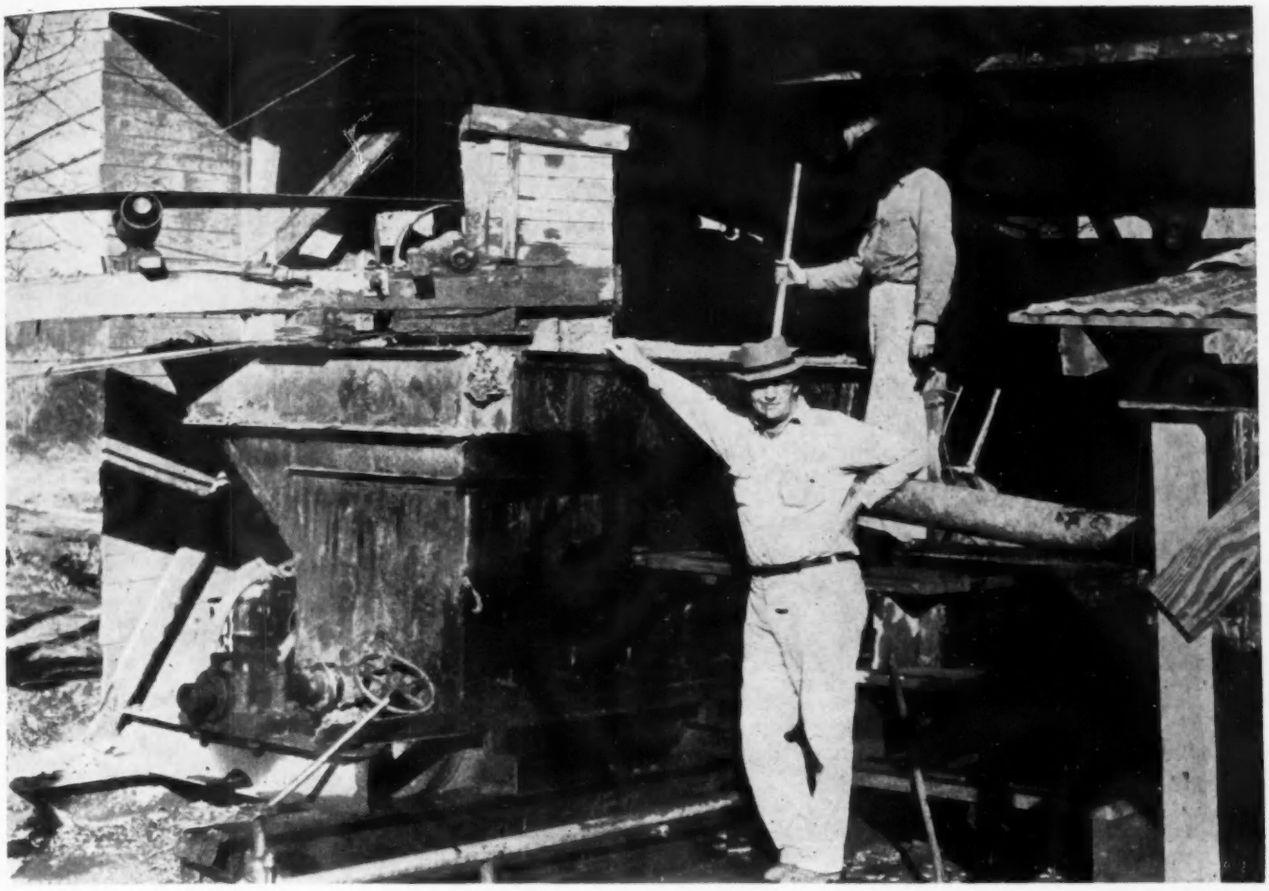
Reduced mud particles float to the surface while in the cutting chamber, and the liquid overflows through a slotted steel plate into a sloping 6-inch exhaust line which carries it to a series of three screens for segregating mud fragments for disposal according to size. The strainers have meshes of different sizes, varying from 1½ inches to ½ inch, the first screen removing only the larger particles while fluid containing the smaller ones drops through and into a trough which conveys them to the next screen having smaller meshes. Afterwards, the third screen with still finer meshes removes other solid particles, and the mud which drains from this strainer is homogeneous enough for drilling fluid, and is pumped into storage tanks and retained until needed. Mixed mud is tested frequently, while straining, with standard mud-testing devices and a special work table provided for determining weight and viscosity.

Tanks Furnish Storage for Mud

As properly processed mud is drained from the final strainer, the second pump, also motivated by belt from drive shaft of the engine, lifts it from the settling ditch below the screen and pumps it into the storage system through a 3-inch line. Storage facilities consist of a wooden box which contains approximately 2200 barrels, and two circular tanks of 1000 and 1600 barrels capacity each. The



The mud conveyor belt is 14 inches wide and ¼-inch thick, and is held in position by wooden track.



Mud is dumped from conveyor belt into a mixing chamber, where whirling blades and jets of water break it down. Properly mixed mud overflows through 6-inch pipe to a series of screens for removal of solids. L. J. Williams, plant superintendent, stands in the foreground, as Louis Mastayeo operates mixer.

usual procedure involves use of the large box as a reserve supply, and mud is directed from plant into it. Mud shipped to rigs is obtained from one of the two tanks; and the supply of these tanks is kept intact by replenishing from the mud box as the tank supply is depleted. This system speeds loading to mud barges as the tanks are elevated sufficiently to permit discharge by gravitation.

The mud storage box is set over a hollow in the ground which provides a suitable bottom and which has a capacity estimated at 350 barrels. Sides of the box are made of 2 x 12-inch unpainted fir planks, heavily reinforced with timbers on the outside and by steel tie rods on the inside attached to opposing walls and stretched taut. Leakage is averted by lining inside of the structure with tin plating placed over all cracks and seams.

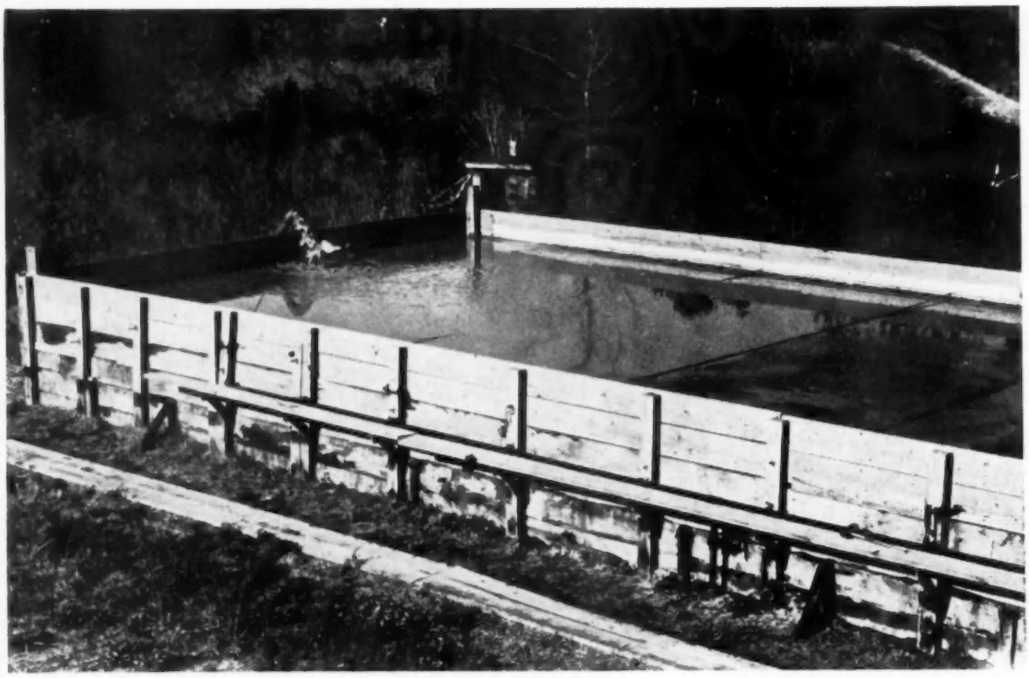
Freshly mixed mud from the mud plant flows into the box at its upper end, and is pumped into steel tanks by means of a suction placed over its deepest point near the center of the box, its height adjusted by rotating a hand winch. The larger circular tank is made of wood, and the other is bolted steel. Disposition of the mud into tanks is regulated by means of gasoline pumps located in a central pump house near the tanks, and the pumps are used as either suction or discharge, with a manifold provided to allow circulation in any direction, or to unload barge by pumping its load into an auxiliary tank. Loading mud on barges from tanks is usually accomplished by gravitation, as the mud storage tanks are located on the elevated banks of the bayou. However, the gasoline pumps are adapted for boosters to expedite loading.

Mud Barges

The Texas Company uses three barges for delivering mud to rigs. Of these, only one was constructed solely for transporting mud, while the other two were regular barges converted for that purpose. The flat-bottom barges draw about six feet of water when fully loaded, and have capacities ranging from 1000 to 1200 barrels. Beneath the flat decks, the barges have false bottoms which provide independent mud tanks, to allow complete emptying. Sides and deck of each barge form part of the mud tank, but a separate steel V-shaped structure comprises its bottom, tapering from 18 inches at its sides to five feet at the center, with clearance between hull and walls of the mud tank. Interiors of the tanks are divided into seven compartments, each independent of the others and having separate suctions, with provisions made for loading or unloading all sections either simultaneously or individually.

A pump is located on each barge deck for unloading when other facilities are not available. The pumps operate on steam which is obtained by connecting with a steam line on rig where mud is delivered, and are placed on the aft decks in sites selected to allow maximum space for carrying pipe or other equipment on deck.

Mud is quickly hauled to the rig where it is needed, saving mixing time at the rig and eliminating in-



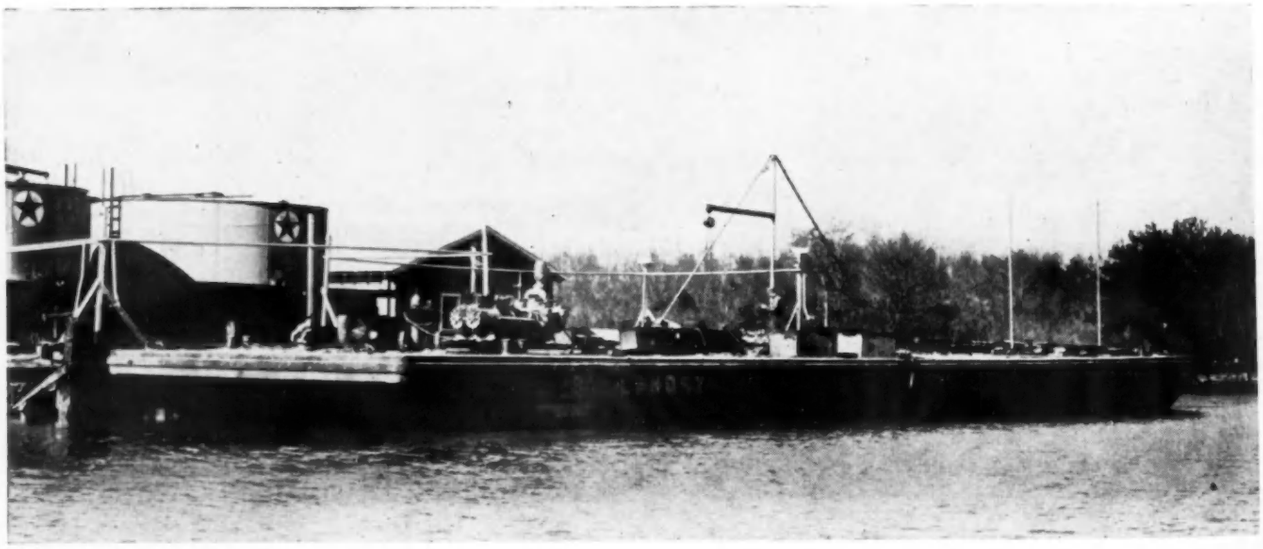
Mixed mud is pumped from mixing machine into wooden box for temporary storage, from which it is fed into smaller tanks for loading on barges. The bottomless box sets over a hollow, and holds 2200 barrels.

stallation of facilities for mixing light-weight drilling fluids. These muds are inexpensive, and when wells are completed, are usually pumped into the water at the drilling site. However, when expensive chemical muds are used, and surplus quantities are left over after wells are completed, pump and storage facilities are designed to permit saving the valuable mud for future use. Mud washed from the well in cleaning is pumped into barge and brought to the Montegut storage terminal, where, by means of the pumps on the bank, it is diverted into either of two 500-barrel steel bolted storage tanks provided for storing such muds, and saved until needed.

Capacity of Mud Plant

When the plant is in full operation, six men are employed to dig and mix mud. Four men work in the excavation pit near the belt, shoveling mud and placing large lumps on the conveyor for carrying to the cutting machine. One man operates the engine governing the cutting and the pumps, while the sixth is stationed at the strainers to keep the meshes clean and uncongested, and to test the fluid prior to its storage. When operating at full capacity, the plant produces about 350 barrels of 10¾-pound mud daily.

Cost of the mud is low, in recent production amounting to only 9½ cents per barrel, although it is estimated that present cost has increased to 11 or 12 cents per barrel. Initial investment was small, and upkeep is kept at a minimum by operating plant only at intervals sufficient to keep tanks filled. Mobility of barges permits rapid and economical distribution of mud to rigs, relieving drilling crews of mixing light mud, leaving them only the task of preparing special muds for extreme drilling conditions.



Barges used to carry drilling mud to rigs have capacities ranging from 1000 to 1200 barrels, have V-shaped false bottoms which permit complete drainage. Mud sections are divided into several compartments.

Fuel Oil Supply

Reaches Critical Level; Taking Drastic Measures to Halt Eastern Stock Decline

By J. V. HIGHTOWER, Staff Writer

IN THE face of an estimated record demand for heavy-fuel oils this year, the decline in stocks of this product is critical. Currently, inventories of residual fuels have been carried to their lowest level in many years by an especially sharp rate of withdrawal in the past few months. The industry is faced with the necessity of building up depleted fuel oil storage during the next five or six months, so as to meet the seasonal demand of next fall and winter, much of which will be from vital war industries and military activities. The situation is particularly critical in the industrialized East Coast territory, however, the drop in heavy-fuel stocks has been nationwide. The rate of depletion has been such as to demand all the study at present being given the problem of how to halt this dangerous trend.

The magnitude of the decline is seen in the withdrawal of 11,756,000 barrels of heavy fuel from storage during the first three months of the year, which rate was almost twice that of 1941 and nearly three times that of 1940. Consequently, the nation's stocks of heavy fuel have dropped from 95,891,000 barrels to 83,045,000 barrels between the end of December and March, and currently are 12.3 percent lower than a year ago. The situation is further aggravated by the concentration of most of the country's inventories on the West Coast. The region east of the Rocky Mountains now has but 23,332,000 barrels of fuel oil in storage, and of the 11¾ million barrels withdrawal during the past three months almost 8½ million barrels was in this territory. Conditions are even more critical along the East Coast, where 6,702,000 barrels have been withdrawn in the past three months and only 5,618,000 barrels remain in storage. Therefore, at current rates of withdrawal all inventories east of the Rocky Mountains would be depleted in another 3 months and the East Coast stocks will last but a little over two months. Fortunately, the heaviest consuming season for heavy fuel is closing, and these stocks can be expected to last longer than indicated by recent trends.

In a move to increase East Coast fuel oil supplies, OPC on March 27 ordered alteration of refining operations in District 1 from that date until April 30 to increase the yields of heavy fuel oil and reduce the output of gasoline; the delivery of 2,000,000 barrels of heavy-fuel oil by tank car from District 2 and the loading of 1,000,000 barrels by tanker from District 3 in addition to cargoes already scheduled. The situation had become so critical in New England that this action was necessary. However, while relieving the East Coast for the time being, it does not ease the fuel-oil situation since the increased volume moved to the area will all come out of storage in the Middle West, Mid-Continent and Gulf Coast regions.

An estimate of the demand for heavy fuel this year is difficult to make. The Bureau of Mines ceased making monthly consumption estimates last October. That the demand will be appreciably higher than that of 1941, however, is generally expected because the war is bringing acceleration in those industries which are large consumers of heavy fuel. Principal users are railroads, shipping, smelting, mining, manufacturing and the oil industry itself. Combined these businesses usually use about 75 percent

Stocks of Residual Fuel Oil
(Figures in thousands of barrels)

DISTRICT	Mar. 30, 1940	Mar. 29, 1941	Dec. 31, 1939	Dec. 28, 1940	Dec. 27, 1941	Jan. 31, 1942	Feb. 28, 1942	Mar. 28, 1942	First Quarter Withdrawal Rate 1940	1941	1942
East Coast	7,689	8,665	7,976	11,064	12,320	8,789	7,376	5,618	— 287	— 2,399	— 6,702
Appalachian	679	462	494	313	434	505	588	621	+ 185	+ 149	+ 187
Indiana, Illinois, Kentucky	3,138	2,940	3,020	2,959	4,306	4,210	3,959	3,684	+ 118	— 19	— 622
Oklahoma, Kansas, Missouri	1,869	1,904	2,733	2,096	2,164	2,108	1,952	1,761	— 864	— 192	— 403
Inland Texas	1,420	1,432	2,301	1,560	1,288	1,321	1,203	1,115	— 881	— 128	— 173
Texas Gulf	5,327	7,010	6,579	8,191	8,278	9,295	9,369	7,896	— 1,252	— 1,181	— 382
Louisiana Gulf	1,061	2,314	1,213	2,244	2,317	2,197	2,264	1,799	— 152	+ 70	— 518
North Louisiana-Arkansas	432	545	566	420	344	361	281	251	— 134	+ 125	— 93
Rocky Mountain	582	480	515	420	356	624	617	587	+ 67	+ 60	+ 231
Total East of Rocky Mts.	22,197	25,752	25,397	29,269	31,807	29,410	27,609	23,332	— 3,200	— 3,515	— 8,475
California	78,899	68,740	80,223	71,598	62,994	61,779	60,676	59,713	— 1,324	— 2,858	— 3,281
Total United States	103,081	102,614	105,620	102,620	95,891	91,189	88,285	83,045	— 4,524	— 6,373	— 11,756

Source: American Petroleum Institute.

Consumption of Residual Fuel Oils

	1940	1941	1942
January	33,612	33,819	37,500*
February	27,892	31,587	34,000*
March	32,120	33,851	37,000*
April	28,419	32,170	.....
May	27,717	30,998	.....
June	27,007	30,305	.....
July	25,377	29,841	.....
August	28,082	31,769	.....
September	27,395	33,003	.....
October	31,558	35,210*	.....
November	31,314	36,900*	.....
December	35,191	38,100*	.....
Total	355,684	397,553*	445,000*

* Estimated.
Source: Bureau of Mines, except last three months of 1941 and first three months of 1942 which are estimated.

of the heavy fuel consumed. In its last monthly petroleum statement the Bureau of Mines hinted that the demand last January was about 10 percent higher than that of January, 1941. The consensus of several views expressed by oil industry leaders is that domestic demand for heavy fuel may be 12 percent higher than the 1941 figures, if transportation troubles do not affect refining too seriously. This would put the demand at 428,300,000 barrels for the year, in contrast with 398,553,000 barrels for 1941, and but 355,684,000 barrels in 1940. Contrary to recent trends, exports may also have a tendency to rise due to war operations in the Pacific. Exports of heavy fuel in 1940 and 1941 were 16,077,000 and 15,162,000 barrels respectively. A 12-percent gain would raise this figure to 18,000,000 barrels, and the probable total demand for United States heavy fuel oil to 446,300,000 barrels.

With the absolutely necessity of building up these depleted stocks, the industry and government are hard at work on methods of meeting the emergency. Converting from fuel oil to coal is, of course, one means, and is being urged in the East Coast. Most of the East Coast refineries have made or are making this change where possible, although it is declared that the close degree of heat control required in still furnaces makes it difficult to convert such furnaces to coal. The change is more easily made in boiler houses. Many large office buildings and hotels using heavy-fuel oils are reported to be equipped to burn either oil or coal, and a large number of these are recently said to have turned to coal on the East Coast because of the oil shortage. Gas and electric power plants and most industries are better fitted to change from oil to coal than are ships and railroads designed for oil. However, it has been pointed out that a serious obstacle to turning to coal is difficulty of obtaining coal-burning and ash-handling equipment. To the extent that such obstacles can be overcome, particularly if fuel-oil prices are raised much higher, an appreciable saving in oil can be effected by converting, for, as one authority has declared, about half the demand for heavy fuel oil is sufficiently elastic to be met by other fuels.

Oil men assert that probably the quickest means of restoring stocks of heavy-fuel oil, aside from improving transportation into the most seriously depleted regions, is enlarging the yield of this fuel from crude. Such a move would entail a change in refinery operations in the direction of smaller profits unless a change in the price structure is permitted. Companies serving the East Coast were recently granted an additional 20 cents per barrel for heavy fuel, but this was compensation for tank-car costs. It is understood that OPC is making a study of further adjustments which may be allowed refiners to turn from gasoline to more fuel oil production.

A step was taken to raise the yield of heavy fuel oil when OPC recently approved a plan prepared by the general committees of Districts 1, 2 and 3. The plan was specifically directed toward the refineries of District 1 but is considered to be applicable to other districts. This plan called for changing refinery operations to produce a 5-percent increase in the yield of fuels of No. 5 grade or heavier, and producing no fuels of No. 5 or heavier which are less than 14° API gravity. Other arrangements dealt with different phases of the fuel oil problem. Although details of means adopted to bring about these changes are not disclosed, it is apparent that less cracking is contemplated, because the plan stipulates that the higher yield of heavy-fuel oil shall be accompanied by a corresponding drop in motor-fuel yields. It is pointed out that this entails less extensive cracking of reduced crudes, because in the production of more heavy fuel from gas-oil cracking, more gasoline is produced.

Along with decreased cracking is the obvious method of raising heavy-fuel oil yields per barrel of crude by running a greater volume of heavy crudes of the California type. In this connection it is noteworthy that the District 5 office of OPC is studying the reserves of heavy California crudes and the prospect of new discoveries. Such crudes, of course, yield high percentages of oil of heavy-fuel grade and relatively small percentages of gasoline when cracked. The limited availability of heavy crudes at many refineries restricts their use.

Distribution of Residual Fuel Consumption

Type of Consumption	Sales, 1000 Barrels 1939	1940
Railroads	60,977	64,904
Marine	65,146	61,554
Gas and Electric Power Plants	27,908	28,234
Smelting, Mining and Manufacturing	60,851	66,610
Heating Purposes (No. 5 and 6 Fuels)	39,101	44,846
Navy, Army and Coast Guard	5,044	5,242
Oil Companies	48,241	50,864
Miscellaneous	4,990	5,313
Total	312,258	327,567

Source: Bureau of Mines.

The idea of increasing the yield of heavy fuels by less extensive cracking or by blending light fuels into heavy stocks would mean, of course, that the gravity of heavy fuels would be raised and the flash point lowered. This method is considered a practicable move in the present emergency, although it means putting light oils into residual stocks of relatively low value. A given stock of 10-gravity heavy fuel can be increased by nearly 30 percent when blended to 14 gravity by the addition of 30-gravity distillate. It is considered that the changed qualities of heavy-fuel oils caused by addition of lighter fuels can be tolerated without trouble by oil burners which have been operating on the heavy stocks.

A further upward price adjustment for heavy fuels is considered necessary by refiners. If greater yields of these products from crude are to be obtained, since it requires sacrificing oils of higher value to produce those of lower value. The important thing, however, is that the yield increase can be obtained by the industry at large, and fortunately the prospective demand for motor fuel in the coming months is likely to be low enough to warrant less cracking and the production of more heavy fuels. Changes in refinery-operating conditions to bring about this alteration are considered practicable, particularly in the numerous plants having combination cracking units, which are characteristically flexible.

Water Flooding Efficiency Aided by Laboratory Flooding Tests

By R. C. EARLOUGHER
Geologic Standards Company, Tulsa

IN EVALUATING an oil property for water flooding, the first important factor to determine is the amount of oil in place in the sand. That is the amount of oil remaining in the sand at the end of the primary recovery period or after a secondary period of gas injection. In most cases it is possible to determine this factor in an old field by securing a number of cores and analyzing each of them for oil content expressed both as barrels per acre-foot and in percent saturation of the total pore space of the sand.

After an examination of several hundred cores from the shallow sand in nearly every part of the Mid-Continent area, together with many cores from the Bradford and Richburg sands of Pennsylvania, it has been found that a relatively close determination of the oil content of the sands can be secured from cores taken with either rotary or cable-tool equipment. Furthermore, probably 95 percent of the time the oil content can be secured directly from the core without applying illusory factor in the known ranges of: (1) formation pressure of 0 to 70 pounds per square inch; (2) gravity 28 to 36 degrees API; and (3) permeability from 1 to 350 millidarcys. At this time the above statement is limited to these conditions inasmuch as that is the range covered by the data at hand. It is acknowledged that in some cores, perhaps, there may be a reduction in the oil content of the core because of slight flushing; however, it has been found that for the most part the values obtained from a core are quite reliable in so far as that core is representative of the field.

Acknowledging then that it is possible to find the oil content of the sand in the field under consideration for flooding from the analyzation of several cores, the engineer's next problem is to estimate the amount of oil that is economically recoverable by water flooding. In the early days of core analysis and water flooding the accepted practice was to assume that 40 percent of the oil still present in the sand could be recovered by flooding. That figure was probably first obtained from results actually obtained on some properties in the Bradford field and in certain cases was a fair figure. As it applied for those "certain" cases it soon became the common figure used when estimating flood recoveries. It was not long, however, before most engineers working with flooding developments found that the estimation of recoveries was not quite as simple as that — that it was necessary to know more than the total oil content per acre and then take 40 percent of that total as the estimated recovery.

As more and more core data became available together with actual results obtained in the field, it became apparent that the recovery obtainable was dependent among other conditions on the percent oil saturation existing in the sand at the beginning of development and in turn on the amount of oil to be left in the sand at depletion by flooding, i.e., there was some point below which the oil saturation could not be reduced by flooding. In the next few years then it was largely a matter of guess work as to what this point of final saturation was. In time the figure commonly used for Bradford sand came to be 25 percent, even though most engineers admitted that this was mostly a guess. They did agree, however, that there was probably some fairly constant figure for final saturation which when considered with the oil saturation indicated by the core was one of the most important factors governing oil recovery. They had found by that time that it was neither practical nor sound to apply a constant recovery factor such as 40 percent in any and all cases but rather that recoveries might vary all the way from a small percentage to 50 percent and higher, depending upon the individual property.

Field Conditions in Laboratory

Also in the early nineteen-thirties attempts were made to duplicate field operations in the laboratory. Little apparent success was obtained, though, so it was concluded that laboratory flooding tests were of little or no practical value. It was not long, however, until other attempts were made along the same lines to see what could be learned. Considerable work was started at Pennsylvania State College but as few fresh core samples were available for testing, it was necessary for the most part to experiment with artificially saturated samples. At the same time a few of the company laboratories in and near Bradford started making routine flooding tests on a few samples from each core for the sole purpose of determining the final oil saturation after flooding. It soon became apparent from these tests that sands in certain areas of the Bradford field showed relatively uniform final oil saturations, averaging for the most part about 25 percent or 300 barrels per acre-foot. There was strong argument against the use of these figures, however, because of the pressures used in the laboratory (25 to 50 pounds per square inch). It was the contention of several engineers that the results would not apply in the field because of the much lower pressure drop occurring there. As reported in previous literature it remained for W. K. Page and his chief engineer, Paul Phillippi, to get the field proof that the laboratory flooding tests were in close agreement with what might be expected in the field. In one case they cored a well midway between a water-injection well and an oil producer of a five-spot that had yielded 6000 barrels of oil per acre by flooding. The core showed a final saturation equivalent to that

FIGURE 1

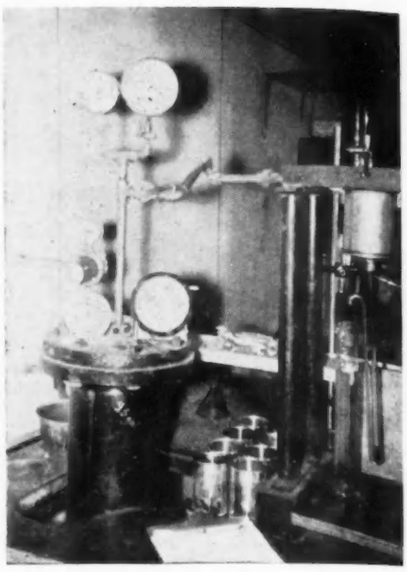


FIGURE 2

indicated by the laboratory flooding tests with the exception of that sand having a permeability less than 0.5 millidarcy. In the second case a well located midway between two injection wells of the five-spot was cored. This core showed a slightly higher oil saturation, indicating incomplete flooding, but samples when flooded in the laboratory showed a final oil saturation after flooding similar to that indicated by the core midway between the water and oil wells.

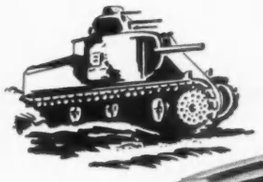
During the years which have passed since the above tests were made it seems to the author that laboratory flooding tests have been neglected in a large degree. It is true that a great many such tests have been and are being run in laboratories over the country but a large percentage of the results have little practical value when it comes to direct application in the field. The reason for this is that most of these tests are being carried on using artificially saturated samples which at the very start necessarily neglect one most important factor — that of interstitial water. It is for this reason that the author and his associates have long advocated the use of fresh core samples from the field for the purpose of laboratory flooding tests. It is also their belief from data secured from many hundreds of tests on samples fresh from the field that some of the problems which have been puzzling flood operators for several years may be solved and also that much more intelligent estimates of recovery can be made.

In order to obtain as nearly representative data as possible a flood sample is taken as a duplicate for each saturation sample, leaving about an inch of core between the two samples for a permeability test. A set of these duplicate samples is taken approximately every foot and a half. Flood samples are sealed in tin cans the same as saturation samples. In the laboratory the saturation samples are tested in the usual manner for oil and water content. Flood samples are then prepared for testing. Each sample (approximately three inches long) is first "faced" on each end with a special cutting wheel, thus leaving a cylindrical sand core with plane parallel ends. Next a half-inch hole is drilled through the center of the core perpendicularly to the ends. During both of these operations care is taken to keep the surfaces being cut immersed in water to prevent heating and subsequent loss of oil.

After each sample has been "faced" and drilled, it is calipered for length and diameter before being placed in a flood pot. The samples are mounted in the pots so that the flow of water will be from the outside of the core to the center. By mounting the samples in this manner it is possible to collect all of the oil flooded out, as well as the flooding water that has passed through the core, by the use of a "U" shaped burette and a short syphon tube. The pots are mounted eight to a battery as shown in Figure 1. The oil remains on top of the water in the burette while the water runs on through and into the graduated cylinder where is is collected. Tap water from a pressure reservoir (Figure 2) is usually used for flooding tests. Pressure is supplied to the tank by compressed air; thus the flooding pressure can be closely regulated by controlling the air pressure on the tank. At completion of the flooding run, samples are taken from the pots and retorted in order to determine final oil saturation. Next the oil recovered during the test is converted by calculation to recovery in barrels per acre-foot. Oil recovered is added to oil remaining and the total figure checked against the initial content as indicated by the adjacent saturation sample. In this way the flood samples serve as a check against the saturation samples. In most cases the two will check very closely for an entire core. One of the most important features of the tests though is the indication of the final oil saturation that may be expected and in turn what recovery may be expected from the sand in the area represented by the core.

After this recovery figure — representing 100 percent efficient flooding — is obtained it is next necessary to determine what efficiency factor should be applied for field adaptation. Experience has indicated that several variables enter into the determination of the efficiency factor. Probably the most important of these are initial oil saturation before flooding, water saturation, permeability and rate of flow to be used during flooding operations.

Many hundreds of tests have been run on core samples having initial oil saturations varying all



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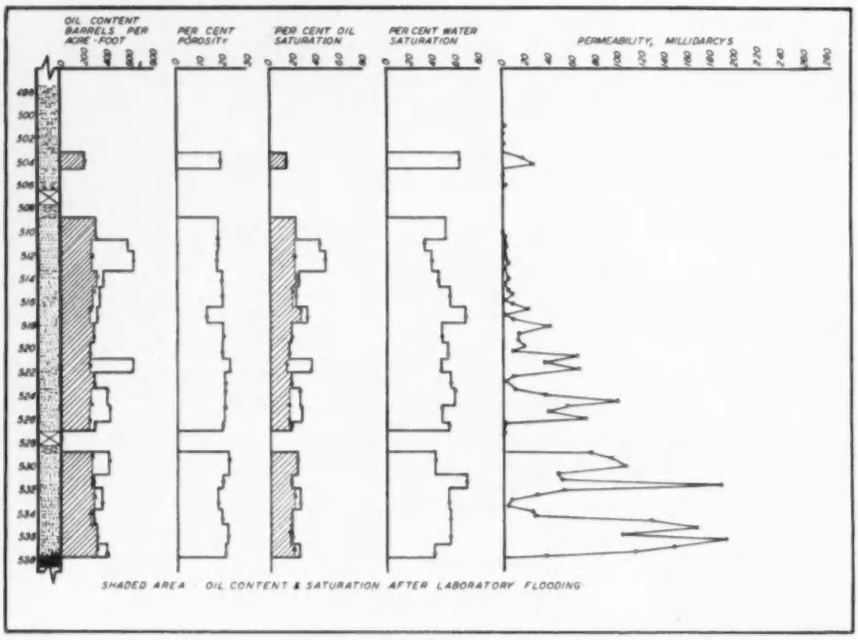

OIL CONTENT BARRELS PER ACRE-FOOT
PER CENT POROSITY
PER CENT OIL SATURATION
PER CENT WATER SATURATION
PERMEABILITY, MILLIDARCYS
SHADED AREA - OIL CONTENT & SATURATION AFTER LABORATORY FLOODING

FIGURE 3

the way from 20 to 60 percent water saturations varying from 25 to 60 percent, and permeabilities ranging from 1 to 350 millidarcys. Also tests on the various samples have been run at pressures varying from 5 to 50 pounds, thus creating a flow rate varying from 0.01 to 19 cc's per minute. In terms of average linear velocity this represents a range varying from 0.003 to 0.48 cm's per minute. In some cores, tests were run throughout at a constant pressure and in others the pressure was increased from 5 to 50 pounds during the flooding period. By running the tests in this manner some very gratifying results have been obtained. The tests in some cores are far from conclusive, but on the whole have strong indications of checking field operations surprisingly well. Already they have definitely proven to be of great aid and practical value to field operations.

Velocity of Flow

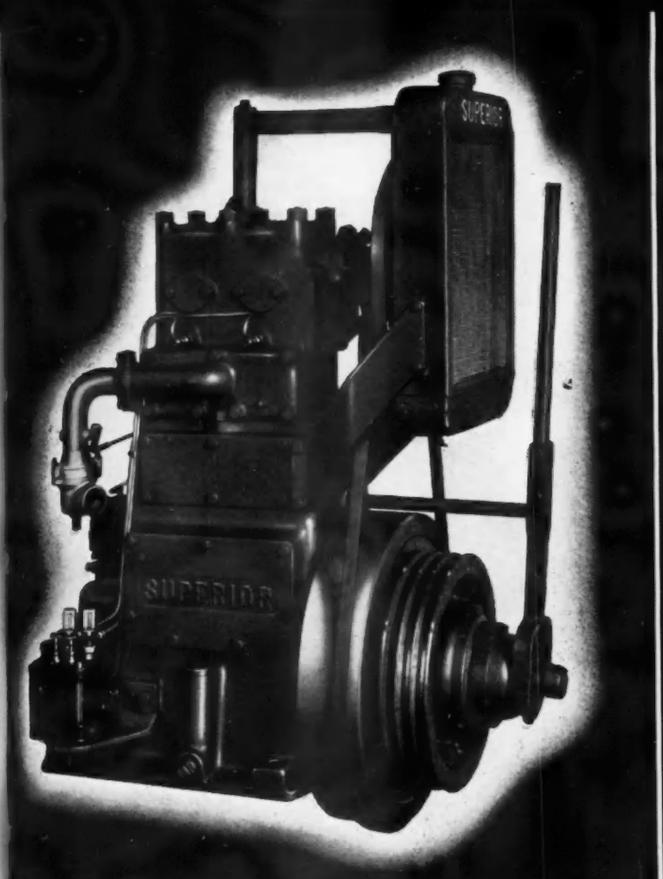
In general they strongly support the concept that velocity of flow or flow rate of the flooding water, rather than pressure, is one of the most important factors in a water-drive operation. Pressure for most practical purposes is only that force necessarily present to create the required velocity. Moreover, above some minimum velocity, slower rates of water flow will yield a greater oil recovery for a given water-oil ratio. Expressed another way, this means that with high rates of water flow, less oil will be produced for a given water-oil ratio than would be produced with a slower flow rate for the same ultimate water-oil ratio. In other words, an excessive velocity of the flooding water will result in unnecessary water by-passing. This is one fact that field men in the Mid-Continent have observed for a long time, i.e., certain water wells if not restricted in water input volumes would "drown out" nearby oil wells, causing a decrease in oil pumped and a tremendous increase in water produced. Many a field man in the Mid-Continent has long feared the use of extremely high water injection rates even though maximum pressures were not required to obtain that rate. He has been well aware of the fact that in most such cases his oil production suffers materially.

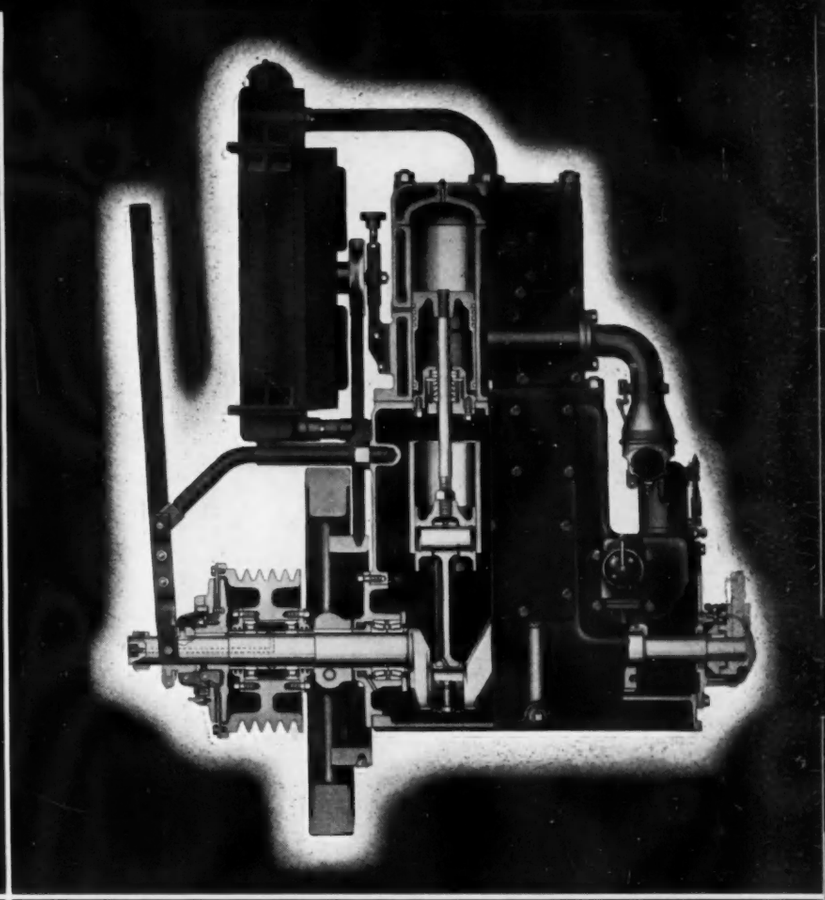
In addition to the above it also appears very evident that the rate of flow which should be used in different sands and in different areas varies considerably. That is to say, in one case an injection rate of 5 barrels per foot per day might be used safely and still obtain a 100 percent oil recovery as indicated by the flooding tests, while in another case with this high rate only a 50 percent recovery might be obtained before the water-oil ratio became too excessive to handle. But in the second case it is entirely possible that with the 5-barrel rate cut to 2 barrels per foot per day, 95 percent of that ultimate recovery could be obtained before the excessive water-oil ratio is reached. With the higher rate it should be mechanically possible to eventually recover all of the oil, but to do so would not be economical because of the excessive volumes of water that would have to be handled. From the flooding data, together with the balance of the core data, it is possible to estimate the most economical injection rate.

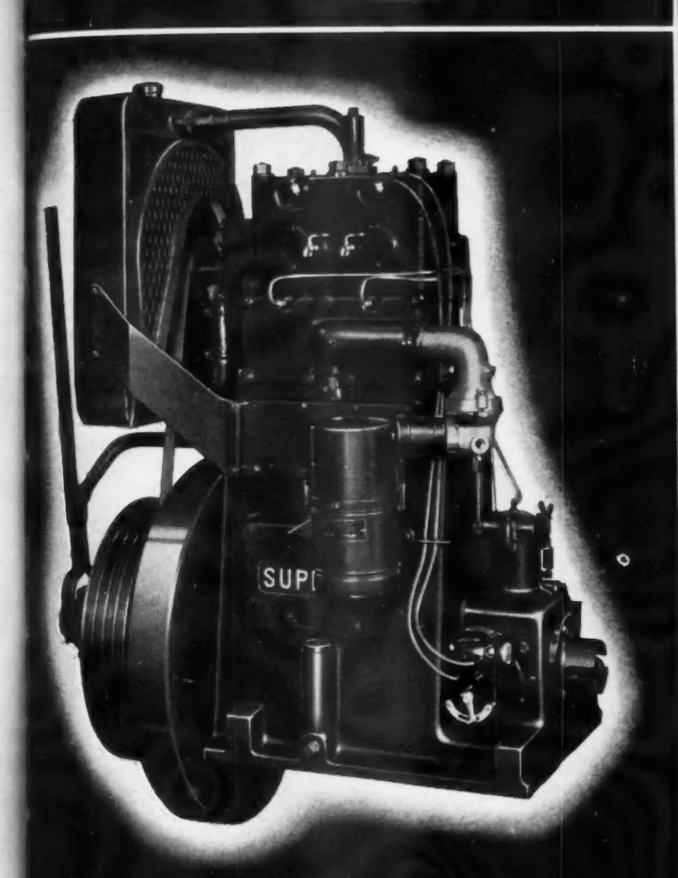
With further reference to the final oil saturation as indicated by laboratory flooding tests, there are data at hand for Bartlesville sand in the Mid-Continent area to corroborate those results reported by Phillippi for the Bradford area. Figure 3 shows the profile of a core taken from the very center of a lease in a watered-out area. The oil content and saturation for the greatest part of the sand is already at the minimum indicated by flooding tests on nearby cores and it will be noted that most of the flood tests on this core showed little or no reduction in oil content upon flooding.

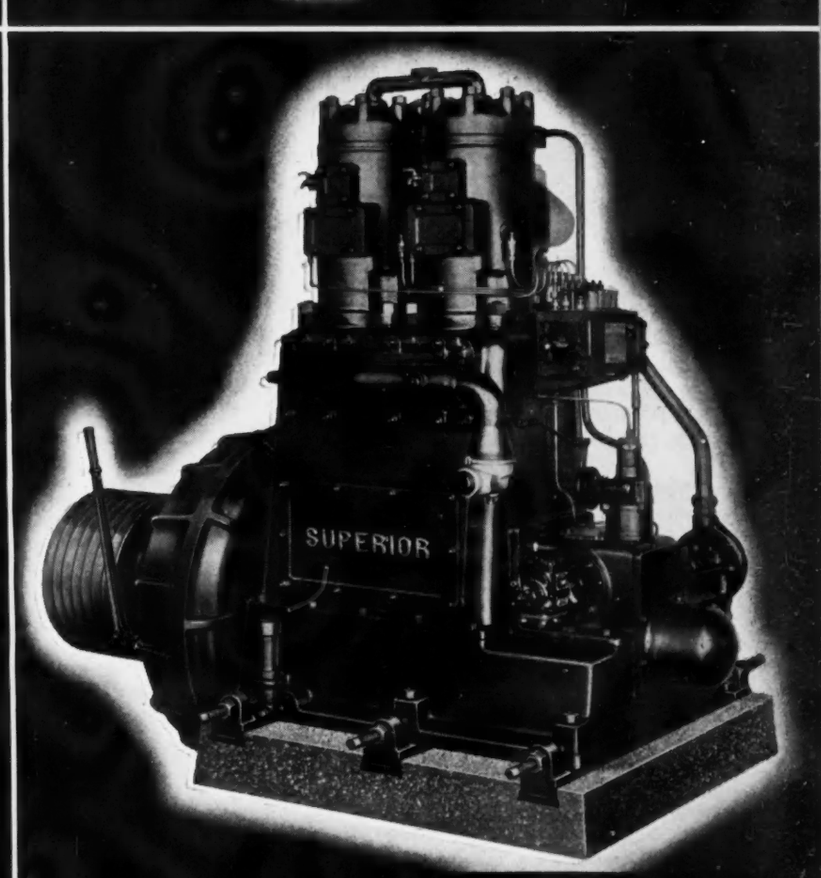
In conclusion then it should be said that the use of extensive laboratory flooding tests on core samples, fresh from the field, is proving extremely important as an aid in the interpretation of core data for the purpose of evaluating a stripper property for water-flooding operations. It is a long way from that first method which considered only total oil remaining in place and a recovery factor of 40 percent; and if applied to its full extent it is a long step ahead of the method which considers mainly the factors of initial oil saturation in place and an intelligent guess at what the final oil saturation should be. In short, data secured from such tests should reflect two very important results: (1) They indicate ultimate volume of recoverable oil present in the sand if 100 percent efficient recovery were to be obtained from the entire sand section. (2) They serve as an extremely useful guide as to what rate of water flow should be used in order to obtain as nearly as possible 100 percent recovery efficiency within the economic limit.

In closing it must be pointed out that other factors, such as range in permeability, also play a vital part in the ultimate oil recovery which can economically be obtained. However, even this factor can be compensated for by certain development and operating methods, which will be discussed in a later article.









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Well Spacing and Lease Allowable Based on Rates of Recovery and Unitized Pressure

By PARK J. JONES, Petroleum Engineer, Fort Worth, Texas

ALLOCATION of allowables based on equal opportunities to produce oil is necessary but not sufficient. An incentive in the form of higher allowables for producing oil efficiently is needed. Such an incentive is the relative producing efficiency which stems from, and can be applied readily under, the concept of unitized pressure. It appears that unitized pressure can achieve what is claimed for unitized acreage without involving the difficulties inherent in the latter. Voluntary unitization of certain acreage and of small tracts would probably be the rule rather than the exception. It is submitted that, if lease allowables were made proportional to rates of recovery and relative producing efficiency, avoidable underground waste, production costs, and steel consumption would be minimized. The discussion is intended primarily for newly discovered reservoirs; however, parts of it may be applied to some of the reservoirs already developed. Inferentially, it is also submitted that if field allowables were made proportional to rates of recovery and producing efficiency it would, in addition, (1) provide uniform payouts as between fields insofar as it is physically and economically possible to do so by absorbing differences through spacing (2) provide a reliable method for determining optimum rates of recovery and (3) provide a scientific basis for pricing crude oil.

This paper was presented before the Spring Meeting of the Southwestern District, American Petroleum Institute, Division of Production, Dallas, February 27, 1942.

THE principle behind producing efficiency is fundamental. It stems from the concept of unitized pressure, which has been applied tacitly for years. If it be assumed that encroaching water, a primary gas cap, and/or solution gas are sources of pressure common to all the oil in a given reservoir, it follows that the tendency to decline reservoir pressure in producing a particular fraction of the oil is not entitled to be any higher than it is in producing any other fraction. This is equivalent to saying that sources of pressure in a given reservoir are unitized. As the fundamental principles controlling production of oil are such that dissipation of reservoir pressure causes avoidable underground waste and increases the cost of producing oil, it is necessary to utilize pressure efficiently. The burden of this paper is to derive quantitative expressions for well spacing and allocation of lease allowables which would enable operators to produce oil efficiently on all types of reservoirs.

Minimizing Avoidable Underground Waste

If operating reservoir pressures are maintained in the neighborhood of virgin bubble-point values, such operations recover as much oil as is possible for the following reasons: (1) the effective viscosity is at its minimum value because gas remains in solution, (2) the effective permeability is at its maximum value because gas cannot evolve and occupy pore spaces, (3) the displacing efficiency of the driving fluid is not reduced by virtue of shrinkage of the oil not produced, (4) the plugging resulting from deposition and accumulation of paraffin in the neighborhood of well bores does not occur because the cooling effect of gas expansion is eliminated, (5) the productivity of wells is maintained because the bottleneck caused by free gas within the first 50 to 100 feet of a well is eliminated, and (6) expansion of solution gas is confined to the upper region of fluid columns where it lightens them and flows wells in some fields to abandonment. The increase in volume of oil produced by such operations may range from 125 up to 200 percent of the oil otherwise producible, that is, from ¼ of a barrel up to 1 barrel more for each and every barrel otherwise producible. The magnitude of the increase depends primarily on virgin bubble-point pressures and economic limits.

Operating reservoir pressures can be maintained in the neighborhood of virgin bubble-point values (1) by not letting the rate of volumetric withdrawal exceed the rate of water encroachment, (2) by injecting gas or water at a rate equal to the rate of volumetric withdrawal on reservoirs having no water encroachment, or (3) by a combination of the two methods.

The volume of oil economically recoverable by maintaining operating reservoir pressures in the neighborhood of virgin bubble-point values is called ultimate recovery. The difference between ultimate recovery as just defined and a lesser volume is called avoidable underground waste. The efficiency with which oil is produced determines the magnitude of avoidable underground waste. On some reservoirs producing efficiency would depend on the feasibility of obtaining and injecting extraneous gas or water.

Rate of Recovery

If the rates of recovery are either too high or too low the result is an economic loss even though ultimate recovery is not sacrificed. For example, if an oil reservoir is depleted at a rate which will require a hundred years to reach abandonment, the result is an economic loss. In the case of pressure maintenance by injection of gas or water, calculations indicate that usually it would not be practical to drill a sufficient number of producing and input wells and to provide the surface facilities required in order to deplete reservoirs efficiently in less than 10 years. Therefore, the maximum rate of production which would neither diminish ultimate recovery nor increase production costs is the opti-

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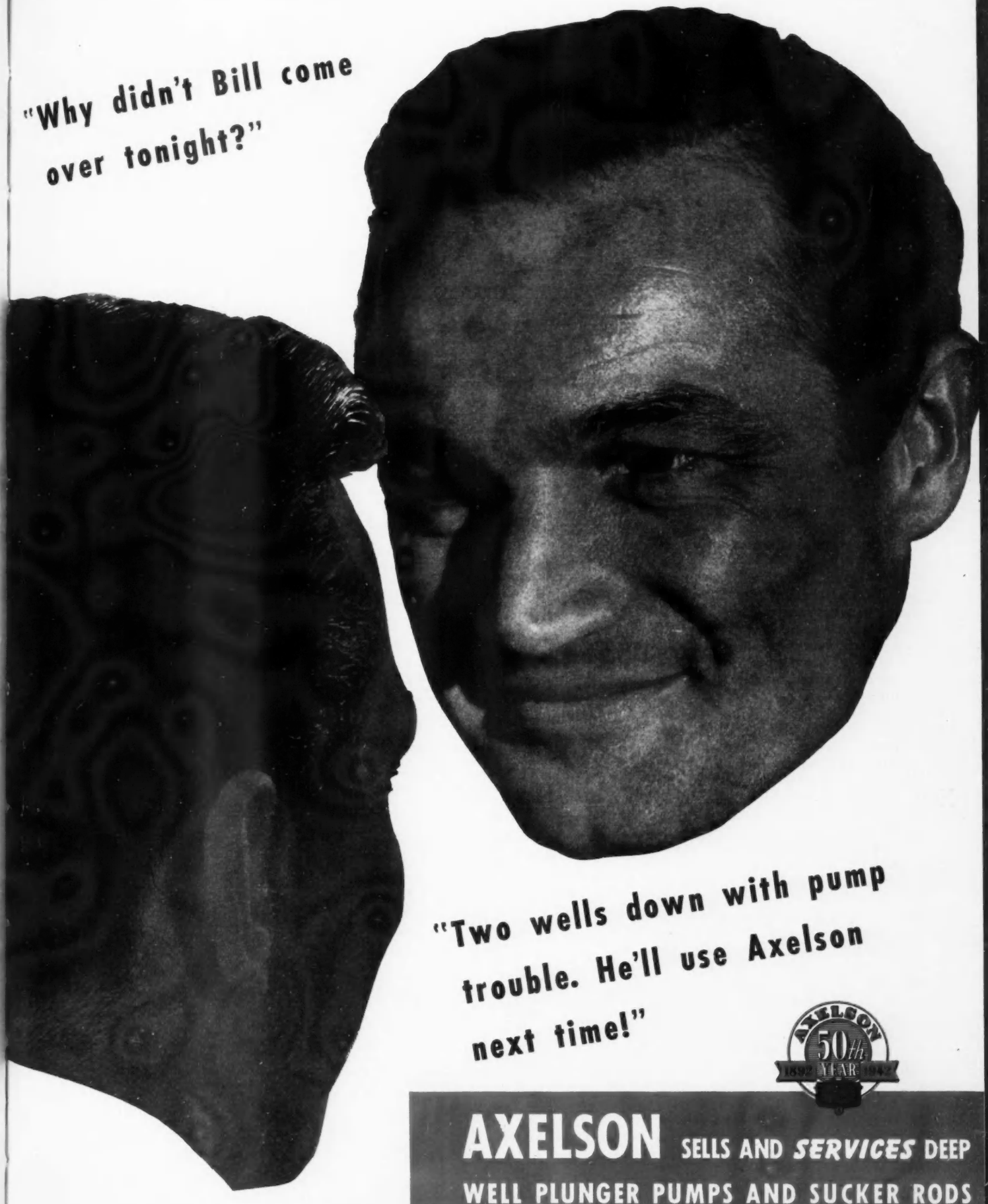

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TABLE 1

Illustrative Example of Relative Producing Efficiency

LEASE	Gas-Oil Ratio Cu. Ft./Bbl. G	Water-Oil Ratio Bbls./Bbl. W	Volume Factor for Oil Bbls./Bbl. ω	Volume of Excess Gas Cu. Ft./Bbl. G—G₁	Volume Factor for Free Gas Bbls./Bbl. Γ(G—G₁)	Volumetric Input Bbls./Bbl. I	Relative Net Withdrawal Bbls./Bbl. N	Relative Producing Efficiency E
1	400	....	1.25	....	....	....	2.50	100.00
2	500	....	1.25	100	.132	....	2.638	94.77
3	800	....	1.25	400	.528	....	3.027	82.59
4	1200	....	1.25	800	1.056	....	3.556	70.30
5	1600	....	1.25	1200	1.584	....	4.084	61.21
6	2000	....	1.25	1600	2.112	....	4.612	54.21
7	600	....	1.25	200	.264	....	2.764	90.45
8	700	0.10	1.25	300	.396	....	2.996	83.44
9	*	....	1.25	*	*	....	*	*
10	400	0.50	1.25	....	....	....	3.00	83.33
Effect of Volumetric Input or Reduced Withdrawal on Producing Efficiency								
4	....	....	....	....	....	1.056	2.50	100.00
5	....	....	....	....	....	1.584	2.50	100.00
6	....	....	....	....	....	2.112	2.50	100.00
10	....	....	....	....	....	0.500	2.50	100.00

Reservoir Data: P = 1600 psi abs.; T = 580° R; Z = 0.72; Γ = 1.32 bbls/MCF; G_1 = 400 cu. ft./bbl.; ω = 1.25 bbls./bbl.

* No well drilled.

mum rate of recovery. It follows from this definition that field allowables should equal optimum rates of recovery.[1] However, as the going or actual field allowables may or may not equal optimum rates, well spacing and lease allowables are discussed in terms of actual values.

The unit rate of recovery is expressed as percent annually of ultimate recovery. For example, a 10 percent rate of recovery means a minimum reservoir life of 10 years. Field experience on various types of oil reservoirs indicates that optimum rates of recovery usually fall within the limits of 4 and 10 percent and that actual field allowables also usually fall within these limits. Yet, optimum and actual rates are not identical for a given volume of oil produced unless the producing efficiencies were equal.

Volumetric Withdrawal and Input

In order that oil can be produced there must be a source of pressure to force oil into a well bore. The principal sources of pressure are encroaching water, primary gas caps, solution gas, and injected gas and water. Withdrawal of fluids, whether they be oil, gas, or water tends to decline reservoir pressure. If it be assumed that edgewater, bottom water, free gas, and/or solution gas are common to all the oil in a given reservoir, it follows that the tendency to decline pressure in producing oil is not entitled to be higher on one lease than on another.

The volume of fluid withdrawn per barrel of oil produced is called volumetric withdrawal. The tendency to decline pressure on a given reservoir is proportional to volumetric withdrawal which, in turn, depends on gas-oil and water-oil ratios. For example, if oil is being produced with a gas-oil ratio G and/or a water-oil ratio W, the corresponding volumetric withdrawal O is given by

$$O = \omega + \Gamma (G - G_1) + W \qquad (1)$$

in which

$$\Gamma = 5.04 \frac{TZ}{P} \qquad (2)$$

and where

O = Volumetric withdrawal, bbls. of fluid/bbl. oil

W = Volume of water, bbls./oil

ω = Volume factor for oil, bbls. of pore space occupied by one bbl. of oil and its solution gas

T = Absolute reservoir temperature

P = Virgin bubble-point pressure, psi absolute

Z = Compressibility factor, no units

G_1 = Volume of gas in solution at P and T, cu. ft./bbl. oil

G = Gas-oil ratio with which oil is produced, cu. ft./bbl. oil

$G - G_1$ = Volume of gas produced in excess of solution gas, cu. ft./bbl. oil

Γ = Volume factor for excess gas, bbls. of pore space occupied by one MCF of gas at P & T

If the rate of water encroachment is not sufficient to maintain reservoir pressure in the neighborhood of virgin bubble-point values, gas or water may be injected in order to maintain producing efficiency. The volue injected into a reservoir per bbl. of oil produced is called volumetric input. Its value is determined in the same manner as volumetric withdrawal. For example, if X cubic feet of gas, and/or Y barrels of water, per barrel of oil produced are injected, the corresponding volumetric input I is given by

$$I = X\Gamma + Y \qquad (3)$$

The net volumetric withdrawal is equal to the difference between volumetric withdrawal and input. Net volumetric withdrawals may also be decreased by workovers which reduce gas-oil and water-oil ratios.

Producing Efficiency

Producing efficiency may be defined in various ways. However, for the purpose of minimizing avoidable underground waste it is advantageous to emphasize the relative efficiency as between leases on a given reservoir. Without taking up time and space in discussing the why's and the wherefore's, it is suggested that relative net volumetric withdrawal be defined by

$$N = \omega + O - I \qquad (4)$$

and relative producing efficiency by

$$E = \frac{N_L}{N} \qquad (5)$$

where N_L is the least relative net volumetric withdrawal. The suggested equations provide for relative producing efficiency on all types of reservoirs including those having little or no water encroachment,[2] and they favor leases having lesser producing efficiency. An illustrative example of relative pro-

TABLE 2

Example of Allocating Lease Allowables in Terms of Acre-Feet and Producing Efficiency

LEASE	Acres, a	Feet of Pay, h	Relative Producing Efficiency, E from Table 1*	Products ahE	Lse. Allow., Q Bbls./Day
1	640	22	1.000	14,080	1,073
2	1020	20	.9477	19,333	1,473
3	80	18	.8259	1,189	91
4	340	16	.7030	3,824	291
5	2762	14	.6121	23,669	1,803
6	1570	10	.5421	8,511	648
7	984	19	.9045	16,911	1,288
8	3897	20	.8344	65,033	4,955
9	5	18	1.000†	90	7
10	634	16	.8333	8,453	644

* First ten lines.

† No well drilled, value assumed.

Σ(ahE) = 161,093 F = 12.273

[1] Allocation of field allowables is beyond the scope of this paper. See Pogue, J. E., Economics of The Petroleum Industry, "Elements of the Petroleum Industry," chap. XX, A.I.M.E., New York, 1940.

[2] No comparison of relative producing efficiency as between two reservoirs is intended.

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TABLE 3
Inducement for Efficient Operating Methods

LEASE	Acres, a	Feet of Pay, h	Relative Producing Efficiency, E from Table 1*	Products ahE	Lse. Allow., Q, Bbls./Day	Inc. in Allow., Bbls./Day
1	640	22	1.000	14,080	926	....
2	1020	20	.9477	19,333	1272	....
3	80	18	.8259	1,189	78	....
4	340	16	1.000	5,440	358	67
5	2762	14	1.000	38,668	2543	740
6	1570	10	1.000	15,700	1033	385
7	984	19	.9045	16,911	1112	....
8	3897	20	.8344	65,033	4278	....
9	5	18	1.000†	90	6	....
10	634	16	1.000	10,144	667	23
				186,588	12,273	

* Last four lines for leases 4, 5, 6 and 10.
† No well drilled, value assumed.

ducing efficiency is listed in Table 1.

If D is the annual rate of recovery from a given reservoir, V the ultimate recovery from a given lease relative to no migration of oil, and E the relative producing efficiency, then lease allowables Q_l in bbls. per day are given by

$$Q_l = \frac{DVE}{365} \tag{6}$$

Letting F equal field allowable, then

$$\frac{D}{365} \sum_{l=1}^{n} (VE)_l = F \tag{7}$$

that is, the sum of lease allowables equals field allowable. Whence, the allowable Q_l for any one of a total of n leases on a reservoir is given by

$$Q_l = \frac{(VE)_l \quad F}{\sum_{l=1}^{n} (VE)_l} \tag{8}$$

Now, aside from migration of oil the relationship between acreage, pay thickness, and porosity and ultimate recovery is given by

$$V = \frac{.776}{\omega} (afhR) \tag{9}$$

Where

a = Proved acreage on a lease, acres
h = Average pay thickness underlying a, feet
f = Average porosity for ah, percent
ω = Volume factor for oil, bbls./bbl.
V = Ultimate recovery from lease, bbls.
R = Recovery factor, percent[3]

It will be noted from equation (9) that ultimate recovery is proportional to acreage, porosity, and pay thickness. Whence,

$$Q_l = \frac{(aE)_l \quad F}{\sum_{l=1}^{n} (aE)_l} \tag{10}$$

[3] For a discussion on, and numerical values of the recovery factor see "A Technique for Determining Optimum Spacing of Oil Wells," presented at the API Shreveport meeting, Feb. 27-28, 1941, by Park J. Jones.

or

$$Q_l = \frac{(ahE)_l \quad F}{\sum_{l=1}^{n} (ahE)_l} \tag{11}$$

or

$$Q_l = \frac{(afhE)_l \quad F}{\sum_{l=1}^{n} (afhE)_l} \tag{12}$$

The foregoing equations may be summarized as follows: (a) if there is no variation in pay thickness and average porosity or if variation does exist but cannot be established definitely because of non-penetration or laminations of pay and non-pay, lease allowables may be taken proportional to the product of proved acreage and relative producing efficiency, equation (10); (b) if variation in pay thickness is agreed upon but average porosity is deemed uniform, lease allowables may be taken proportional to the product of proved acreage, pay thickness, and relative producing efficiency, equation (11); (c) if variations in pay thickness and porosity are agreed upon, lease allowables may be taken proportional to the product of proved acreage, pay thickness, porosity, and relative producing efficiency, equation (12). In this manner, variations in recovery as between leases on a given reservoir resulting from differences in producing efficiency are wiped out. However, if the wells in a given field are producing from more than one reservoir simultaneously, the foregoing equations may not be satisfactory. For this reason, it is necessary to limit the equations to production from one reservoir only.

Two illustrative examples of allocating lease allowables in proportion to the product of proved acreage, pay thickness, and relative producing efficiency are shown in Tables 2 and 3. In Table 2 the relative producing efficiencies listed in the first ten lines of Table 1 are used. Table 3 is based on the relative producing efficiencies listed in the last four lines of Table 1. The last column in Table 3 may be regarded as a reward for efficient operating methods, which is an incentive for producing oil efficiently and which can be realized by reducing the net volumetric withdrawal either by workovers or injection.

Unitizing Small Tracts

The five-acre tract shown in Tables 2 and 3 is too small to support a well. However, under the method of allocating lease allowables here suggested small tracts have known allowables and therefore known values. Small tracts could be unitized with a contiguous larger lease. The present value of small-tract allowables would be an acceptable method for effecting unitizations.

Well Allowable

If lease allowables were allocated in accordance with the method here suggested, average well allowables Q_w would be given by

$$Q_w = \frac{Q_l}{n} \tag{13}$$

where

Q_l = Lease allowable, bbls./day
n = Number of wells in lease
Q_w = Average well allowable, bbls./day/well

In applying equation (13) it should be remembered that the rate of production from individual wells shall be efficient.

Well Spacing

Based on rates of recovery, well spacing may be calculated in terms of payout. Figures 1 through 9 indicate the results of such a calculation. A 6 percent interest rate was applied in determining payout. First costs are designated as "per producing well" with the thought that input wells and the surface facilities required on reservoirs where fluids are injected will be apportioned among producing wells. If a lesser than the indicated maximum number of wells can produce lease allowables efficiently, payouts would be shorter because per-well allowables would be higher. Lifting costs are intended to include royalty, taxes, labor, and material only.

The data indicated in Figures 1-9 are summarized in Figure 10 with respect to the spacing required for various payouts. Figure 11 shows the daily per-well allowable corresponding to the spacing

TOUGH AS A TIMBER WOLF...

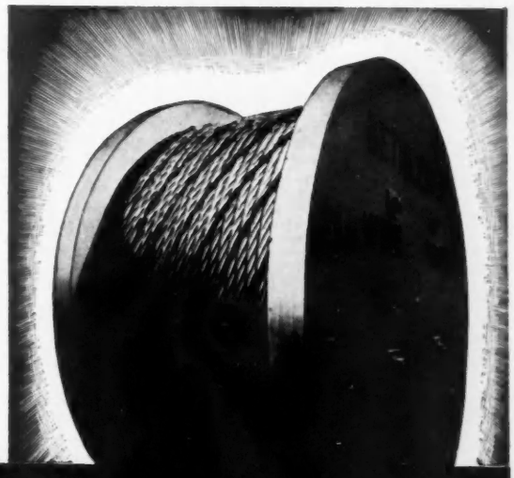
tame as a puppy

Purple Strand Form-Set is the toughest, strongest wire rope in the commercial field . . . and yet it's not wild or hard to control.

Reasons: the premium steel in this rope is preformed (each strand permanently set in the corkscrew pattern it will occupy in the finished rope). As a result, Form-Set rope is relaxed, easy to handle. It can be cut or spliced without seizing, spools easily, and has greater resistance to bending fatigue.

Right now wire rope is a key tool in war production. For efficiency—make it Purple Strand Form-Set.

PURPLE STRAND
FORM-SET
WIRE ROPE



BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY

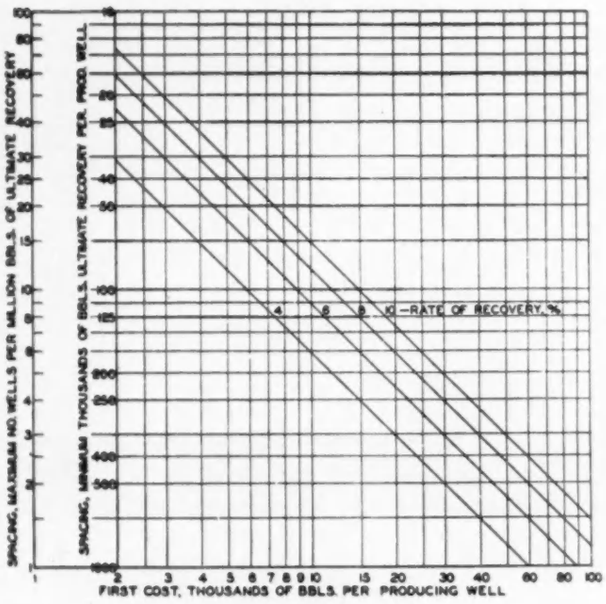
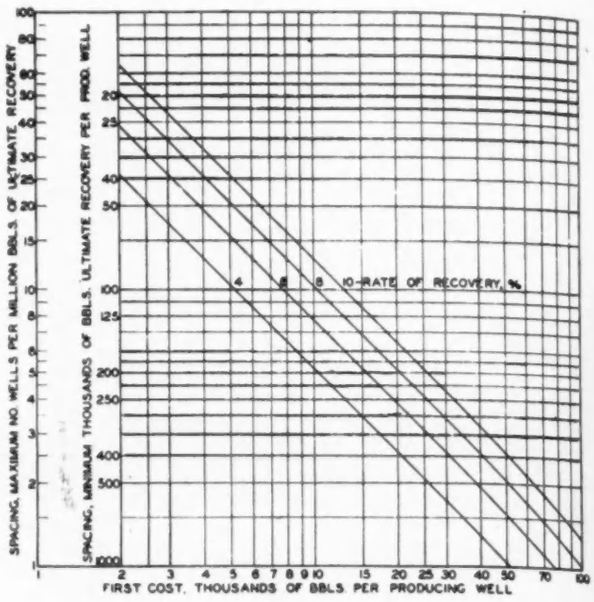

SPACING, MAXIMUM NO. WELLS PER MILLION BBLS. OF ULTIMATE RECOVERY
SPACING, MINIMUM THOUSANDS OF BBLS. ULTIMATE RECOVERY PER PROD. WELL
4 6 8 10 —RATE OF RECOVERY, %
FIRST COST, THOUSANDS OF BBLS. PER PRODUCING WELL

FIGURE 1

Spacing vs. first cost for 2-year payout and 0.2 bbls/bbl lifting cost.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SPACING, MINIMUM THOUSANDS OF BBLS. ULTIMATE RECOVERY PER PROD. WELL
4 6 8 10-RATE OF RECOVERY, %
FIRST COST, THOUSANDS OF BBLS. PER PRODUCING WELL

FIGURE 2

Spacing vs. first cost for 2-year payout and 0.3 bbls/bbl lifting cost.

in Figure 10. Figures 10 and 11 are relative to the maximum number of wells in Figures 1-9. A lesser than the maximum number of wells would have a proportionally higher allowable and a shorter payout.

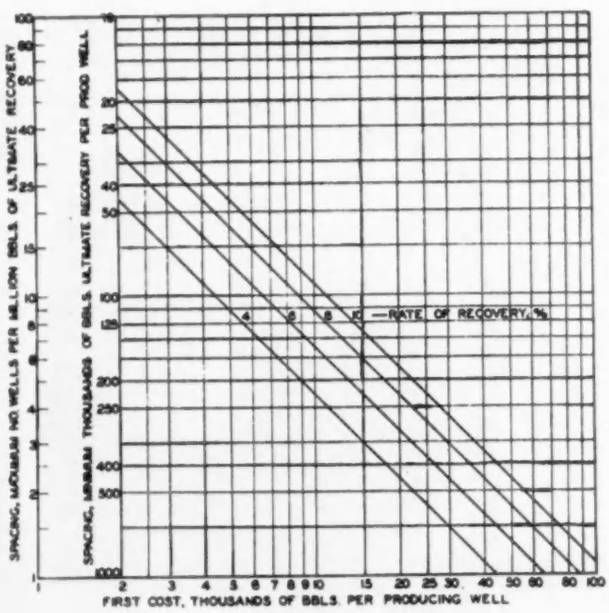
Minimizing Production Costs

Minimization of production costs requires that producing properties be not overcapitalized. If allowables were allocated as here suggested, lease allowables would be independent of the number of wells drilled beyond the minimum number required to produce oil efficiently. Therefore, pressure on operators to drill unnecessary wells would be removed, steel would be conserved, and the cost of producing oil would be minimized.

The significant fact is that under the suggested method of allocating allowables properties would not be overcapitalized because more wells could be drilled subsequent to initial development if field experience established that producing efficiency could be increased either by drilling input wells or more producing wells.

Uniform and Flexible Spacing Pattern

In order that additional producing or input wells can be drilled and result in uniform spacing patterns, it is essential that the initial spacing patterns be uniform and flexible. For example, if conservative estimates of the controlling physical and economic factors warrant a 40-, 20-, or a 10-acre initial spacing, development on alternate 20-, 10-, and 5-acre units would give a uniform 40-, 20-, and 10-acre spacing with provisions for an ultimate 20-, 10-, and 5-acre uniform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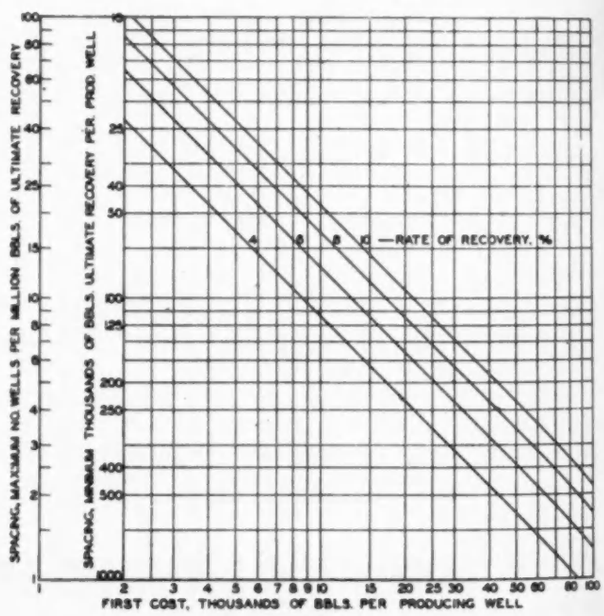
4 6 8 10 —RATE OF RECOVERY, %
FIRST COST, THOUSANDS OF BBLS. PER PRODUCING WELL

FIGURE 3

Spacing vs. first cost for 2-year payout and 0.4 bbls/bbl lifting cost.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SPACING, MINIMUM THOUSANDS OF BBLS. ULTIMATE RECOVERY PER PROD. WELL
4 6 8 10 —RATE OF RECOVERY, %
FIRST COST, THOUSANDS OF BBLS. PER PRODUCING WELL

FIGURE 4

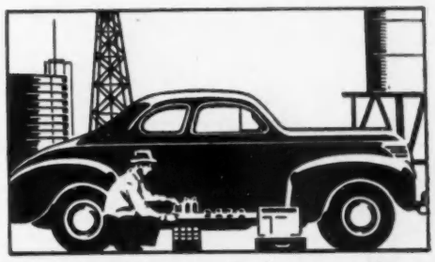
Spacing vs. first cost for 3-year payout and 0.2 bbls/bbl lifting cost.

on Guard!

TO INSURE EFFICIENT DEHYDRATING ON THIS WELL, TRET-O-LITE IS INTRODUCED AT THE WELL HEAD.

ALL CRUDES do not respond similarly to a single treating compound or method. Because of this, there is a Tret-O-lite representative in your production area. He has studied the problems in the field and can advise you on the most efficient dehydrating system for the conditions on your lease. This is but one phase of Tret-O-lite Advisory Service . . . there are many, all designed to obtain more efficient and economical dehydration . . . to guard against waste and losses due to inferior procedures.

Tret-O-lite representatives are "on call" to assist you on any emulsion problem. There is no charge for Tret-O-lite Advisory Service.



Tests carried out on the lease provide an accurate means of assuring a proper compound selection.

tret-O-lite

REG. U. S. PAT. OFF.

DEHYDRATING DESALTING

TRETOLITE COMPANY

Manufacturing Chemists

WEBSTER GROVES, ST. LOUIS COUNTY, MO.
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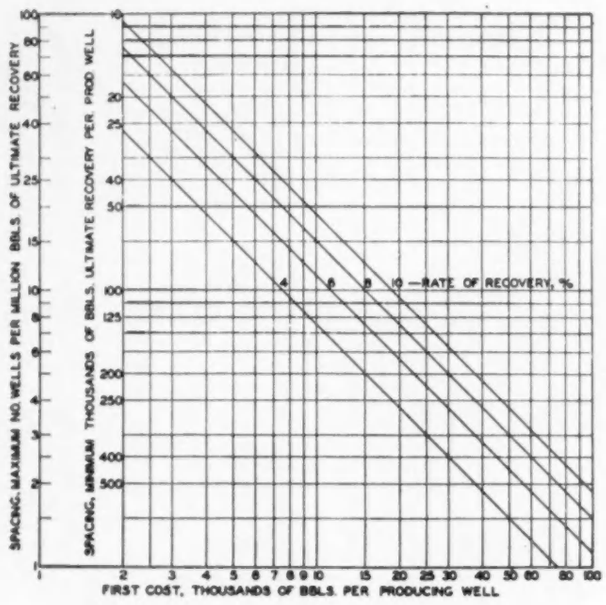
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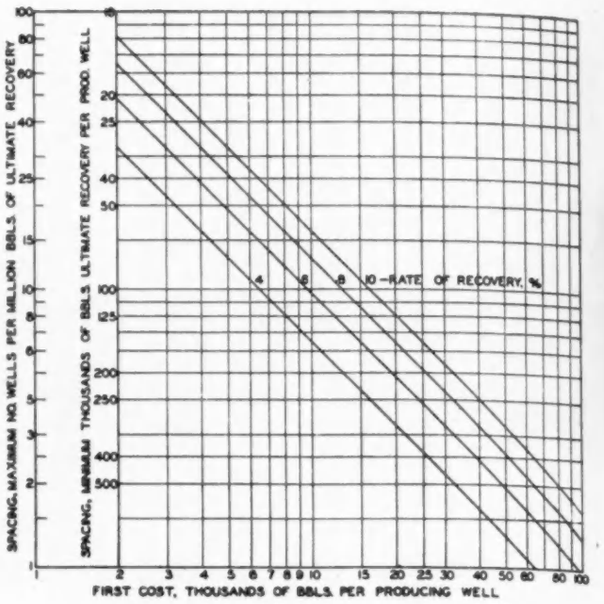
4 6 8 10 —RATE OF RECOVERY, %
FIRST COST, THOUSANDS OF BBLS. PER PRODUCING WELL

FIGURE 5

Spacing vs. first cost for 3-year payout and 0.3 bbls/bbl lifting cost.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SPACING, MINIMUM THOUSANDS OF BBLS. ULTIMATE RECOVERY PER PROD. WELL
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FIRST COST, THOUSANDS OF BBLS. PER PRODUCING WELL

FIGURE 6

Spacing vs. first cost for 3-year payout and 0.4 bbls/bbl lifting cost.

spacing respectively. As allowables based on the method here proposed are independent of the number of wells drilled, uniformity and flexibility in spacing patterns would be achieved.

Procedure for Determining Spacing

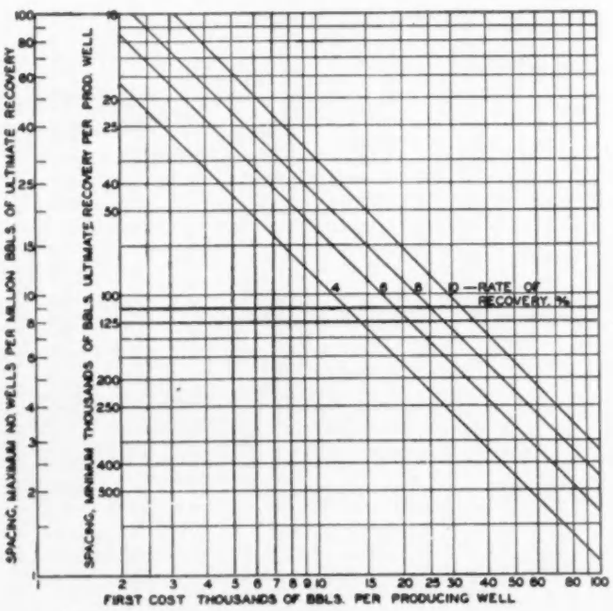
A procedure for determining spacing when lease allowables are based on rates of recovery and producing efficiency can be outlined here but briefly. Upon completion of a discovery well and probably a few additional wells, the following information is usually available: virgin reservoir and bubble-point pressures; volume factor for oil; probable source of pressure, that is whether water-drive or gas-drive; type of pay; approximate pay thickness, porosity, and permeability.

These data plus structural and stratigraphic information are sufficient for making conservative estimates as to ultimate recovery, operating methods, operating costs, and rate of recovery. Figures 1-9 may then be applied for determining spacing in terms of desired payout.

The spacing agreed upon shall be divided by two to obtain a spacing unit. Such wells as are drilled shall be located in the center of alternate units but not all alternate units need be drilled. No more wells are required than necessary to prove acreage and produce lease allowables efficiently.

Unitizing for Producing Efficiency and Migration

Minimization of avoidable underground waste and production costs on some reservoirs depends on not drilling certain locations. If lease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4 6 8 10 —RATE OF RECOVERY, %
FIRST COST THOUSANDS OF BBLS. PER PRODUCING WELL

FIGURE 7

Spacing vs. first cost for 4-year payout and 0.2 bbls/bbl lifting cost.

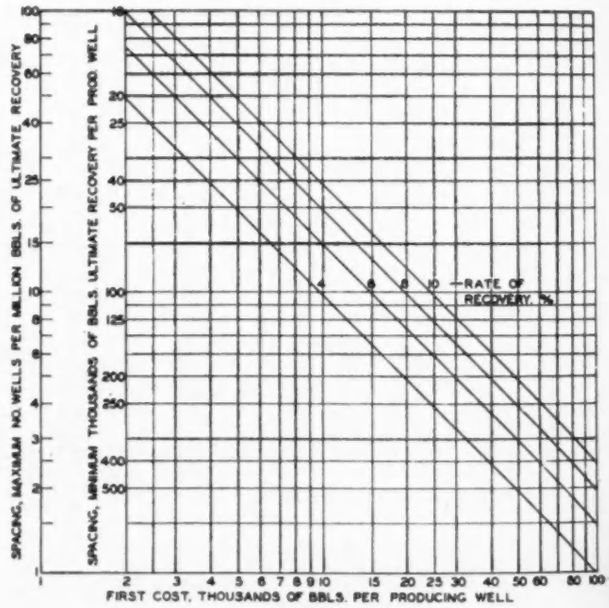

SPACING, MAXIMUM NO. WELLS PER MILLION BBLS. OF ULTIMATE RECOVERY
SPACING, MINIMUM THOUSANDS OF BBLS. ULTIMATE RECOVERY PER PROD. WELL
4 6 8 10 —RATE OF RECOVERY, %
FIRST COST, THOUSANDS OF BBLS. PER PRODUCING WELL

FIGURE 8

Spacing vs. first cost for 4-year payout and 0.3 bbls/bbl lifting cost.

STEM OF SPECIAL CORROSION-RESISTING, HIGH STRENGTH ROLLED BRONZE
SUBSTANTIAL WALL THICKNESS OF PRATT & CADY BRONZE VALVES RESIST CORROSION AND EROSION
HEAVY HEX PROVIDES GREAT RIGIDITY
FIRST, REGRIND AS MANY TIMES AS POSSIBLE
THEN REPLACE ONLY THE SEAT AND DISC

...—*Save* ALL THAT BRONZE

READING-PRATT & CADY MADE IT POSSIBLE FOR YOU TO *RENEW* BRONZE VALVES INSTEAD OF REPLACING THEM

It is imperative, when it comes to Bronze and other metals now scarce and strategically important, that we all return to old-time thrift—*use it, mend it, make it do.*

Remember this when your Bronze valves show signs of the wear and tear of 24-hour Victory production because in very few cases do you need to *replace* them.

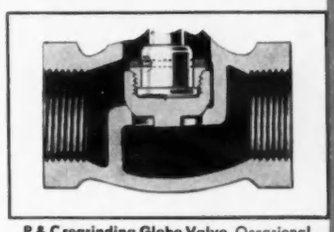
1885—PRATT & CADY INVENT GLOBE VALVE WITH RENEWABLE SEAT AND DISC

By inventing the Globe Valve with renewable seat and disc, Pratt & Cady made it possible for you to *renew* your worn Globe Valves—to use minimum materials and time for the maintenance job.

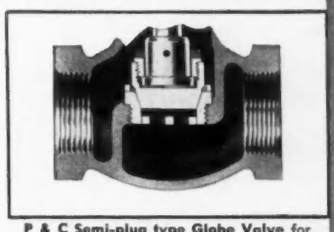
By inventing and patenting the Retaining Ring Gate Valve—diagram at the bottom to the right—Pratt & Cady made it practical to renew the seat of Gate Valves without removing the valve from the line.

So, again, we say save all that *Bronze*. First, regrind disc and seat to an efficient seat as many times as the materials can be worked-over. Then replace only the disc and seat—in that way maintaining your valves at peak efficiency with minimum use of vital materials and precious time. *RENEW* your valves. DON'T REPLACE them.

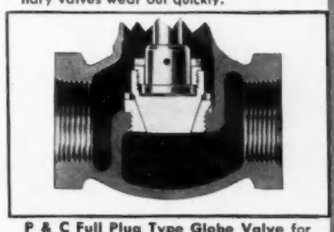
Reading Cast Steel Valves & Fittings • Pratt & Cady Brass & Iron Valves
D'Este Valve and Engineering Specialties



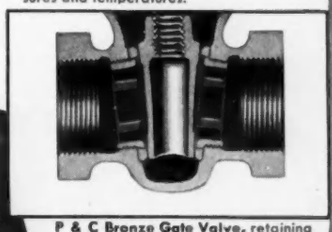
P & C regrinding Globe Valve. Occasional throttling of air, hot water, saturated steam.



P & C Semi-plug type Globe Valve for frequent throttling in services where ordinary valves wear out quickly.



P & C Full Plug Type Globe Valve for severe throttling at maximum rated pressures and temperatures.



P & C Bronze Gate Valve, retaining ring construction. Perfect seating without machining with seat rings in place.

READING-PRATT & CADY
READING, PENNSYLVANIA

A Division of AMERICAN CHAIN & CABLE COMPANY, INC. Bridgeport, Conn.

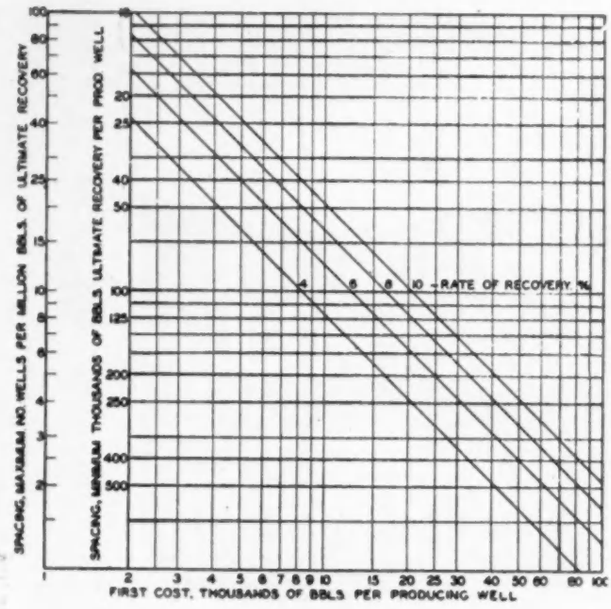

SPACING, MAXIMUM NO WELLS PER MILLION BBLS OF ULTIMATE RECOVERY
SPACING, MINIMUM THOUSANDS OF BBLS ULTIMATE RECOVERY PER PROD WELL
4 6 8 10 -RATE OF RECOVERY %
FIRST COST, THOUSANDS OF BBLS PER PRODUCING WELL

FIGURE 9

Spacing vs. first cost for 4-year payout and 0.4 bbls/bbl lifting cost.

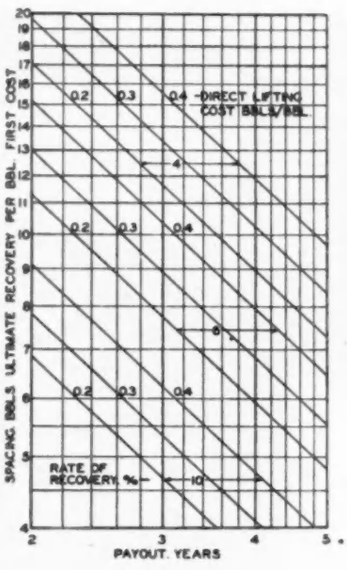


FIGURE 10

Spacing vs. payout corresponding to maximum number of wells in Figures 1-9.

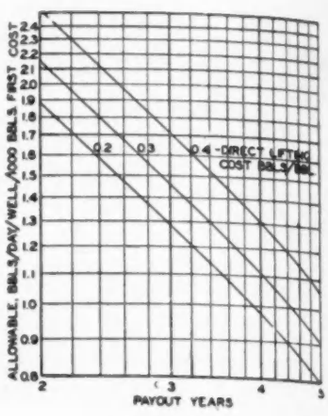


FIGURE 11

Allowable vs. payout corresponding to the spacing in Figure 10.

allowables were allocated as here suggested, selective location of wells would become a routine production practice. In addition, operators would exercise their option to unitize for producing efficiency. Higher producing efficiency would result in higher lease allowables, which are no obstacle to unitization from the viewpoint of royalty owners. On the other hand, unitization of leases because of up dip or down dip migration of oil can be highly profitable to operators and royalty owners. Conditions may exist under which unitized leases would recover anywhere from 200 up to 500 percent as much oil as could be recovered from the same leases not unitized, and a saving ranging anywhere from $10,000 up to $100,000 per undrilled well would be achieved. In short, it appears that unitization of certain leases would be the rule rather than the exception if lease allowables were made proportional to rates of recovery and producing efficiency.

Conclusion

It is submitted that the basis for allocating lease allowables suggested in this paper would minimize avoidable underground waste, production costs, and steel consumption because it would enable operators to produce oil efficiently.

Inferentially, it is also submitted that if field allowables were made proportional to rates of recovery and producing efficiency it would, in addition, (1) provide uniform payouts as between fields insofar as it is physically and economically possible to do so by absorbing differences through spacing (2) provide a reliable method for determining optimum rates of discovery and (3) provide a scientific basis for pricing crude oil.

★ OIL IS AMMUNITION ★ ★ KEEP 'EM PRODUCING ★

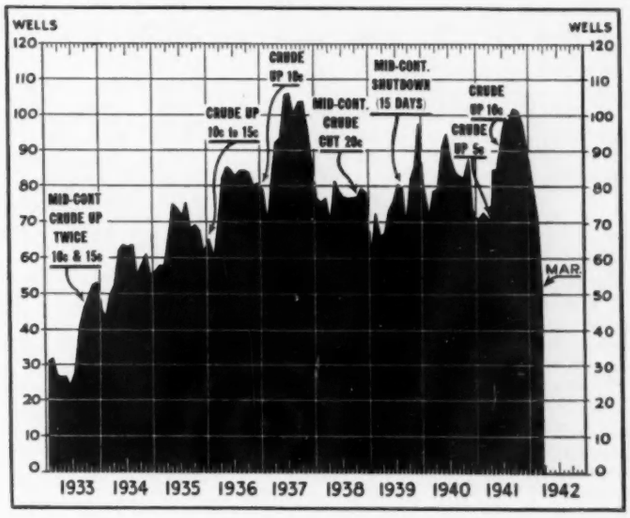
Sharp Drilling Decline Begins Leveling Off

TRANSITION to scheduled war-time curtailed scale of drilling apparently has been almost completed. Although well completions dropped off sharply again in March, indications that there will not occur henceforth any material further decrease in completions is the fact that there were about the same number of drilling rigs operating the beginning of April as a month earlier.

During March, daily average well completions were down 36 percent from the January rate; and on April 1, there were 40 percent fewer wells drilling than in January. These figures indicate that the 40 percent reduction of drilling sought by the Office of Petroleum Coordinator, to save steel and other war materials, already has been practically achieved. Therefore, unless war developments make it advisable to further restrict the industry's usage of steel, it would appear that additional governmental limitations on drilling will not be forthcoming. Of course, the incentive to drill new wells also has been curbed by economic and transportation difficulties, which deterrents remain and must be recked with. It is possible that loss of additional markets because of lessened tire and car usage and further disruption in transportation facilities of active Southwestern states, may limit drilling work further.

Total rigs in operation, including those drilling, rigs built and shutdown, totaled 2979 on April 1, a slight drop from the 3067 in service March 1. However, the number of rigs actually drilling totaled 2063, exactly the same as a month earlier. After the past few months of drastic shrinkages, this development was particularly encouraging. Some states showed increases in wells drilling April 1 as compared with

Average Number of Wells Completed Per Day in United States, by Months



Fewer Wells Completed in Five Weeks Ended March 28 Than in Preceding Four Weeks

STATE OR DISTRICT	MONTHLY COMPLETIONS: Total: Year Ago, Mar., 1941[2]	Total: Month Ago, Feb., 1942[3]	Total: Latest Data (Mar., 1942)[1]	Details for March, 1942: New Wells Drilled for Oil or Gas: Oil	Gas	Dry	Others[4]	Old Wells Drilled Deeper	Total Footage Drilled	CUMULATIVE COMPLETIONS: FIRST 3 MONTHS: Total: 1941	1942	Percent Change	Details for 3 Months of 1942: New Wells Drilled for Oil or Gas: Oil	Gas	Dry	Others	Old Wells Drilled Deeper	Total Footage Drilled
Alabama	....	....	....	....	....	....	....	....	....	....	2	....	....	....	2	....	....	654
Arkansas	12	10	19	14	....	5	....	....	105,479	34	37	+ 8.8	26	....	10	1	....	222,337
California[6]	68	69	68	39	1	17	....	11	313,011	266	239	— 10.1	161	8	55	....	15	1,265,741
Colorado	3	2	1	1	....	....	....	....	6,888	3	3	....	1	....	2	....	....	17,701
Georgia	....	....	....	....	....	....	....	....	....	....	1	....	....	....	1	....	....	1,507
Illinois[9]	309	116[10]	122	70	1	40	....	11	306,861	743	522	— 29.7	321	4	161	8	28	1,323,686
Indiana	43	46	33	11	3	15	....	4	44,464	113	99	— 12.4	44	9	40	....	6	150,171
Kansas	179	133	96	49	3	39	....	5	303,103	456	409	— 9.3	237	20	129	2	21	1,209,419
Kentucky	13	22	9	1	....	8	....	....	9,743	60	42	— 30.0	18	....	24	....	....	50,815
Louisiana	114	88	99	65	1	31	2	....	674,283	324	281	— 13.3	175	7	97	2	....	1,756,021
North Louisiana	40	42	48	28	....	20	....	....	203,367	126	126	....	70	4	52	....	....	451,422
South Louisiana	74	46	51	37	1	11	2	....	470,916	198	155	— 21.7	105	3	45	2	....	1,314,599
Michigan	75	63	43	23	....	19	....	1	118,830	190	170	— 9.5	99	14	56	....	1	430,595
Mississippi	16	10	13	7	....	6	....	....	71,955	38	43	+ 13.1	24	....	19	....	....	225,167
Missouri[7]	4	4	3	....	1	2	....	....	943	15	9	— 40.0	....	2	7	....	....	4,568
Montana	22	11	8	3	3	2	....	....	13,369	48	36	— 25.0	21	10	5	....	....	79,465
Nebraska	4	1	1	....	....	....	....	1	60	22	9	— 59.0	4	....	4	....	1	21,750
New Mexico	33	28	46	31	3	9	....	3	143,921	84	105	+ 25.0	71	3	27	....	4	300,947
New York	63	114	110	56	....	....	54	....	138,263	158	323	+ 104.4	177	2	....	144	....	399,346
Ohio	136	144	77	15	38	22	....	2	199,153	356	326	— 8.4	72	145	98	2	9	786,362
Oklahoma	179	141	125	49	8	46	4	18	350,813	451	446	— 1.1	212	36	150	4	44	1,304,183
Pennsylvania[8]	296	307	323	146	29	11	134	3	549,377	807	912	+ 13.0	429	80	20	375	8	1,518,813
Tennessee[5]	2	1	1	....	....	1	....	....	800	5	3	— 40.0	....	1	2	....	....	2,576
Texas	855	646	555	358	16	158	8	15	2,427,883	2,137	1,917	— 9.3	1,298	52	485	30	52	7,616,916
E. Texas Border Co's	3	1	....	....	....	....	....	....	....	4	2	— 50.0	....	....	1	....	....	7,497
East Texas Field	65	3	....	....	....	....	....	....	....	179	11	— 93.8	8	....	2	1	....	35,924
Rest of Eastern Texas	26	51	31	22	1	8	....	....	154,349	78	128	+ 64.1	84	3	36	5	....	620,780
North Texas	201	122	59	26	....	29	1	3	176,517	489	324	— 33.7	175	1	125	4	19	734,833
West Central Texas	54	50	36	13	1	20	....	2	73,977	142	118	— 16.9	49	5	58	....	6	244,967
West Texas	183	169	191	158	2	25	....	6	837,428	430	560	+ 30.2	469	5	67	....	19	2,350,861
Texas Panhandle	46	64	31	22	7	1	....	1	90,264	120	161	+ 34.1	128	25	5	....	3	479,026
Gulf Coast, Upper	72	47	46	30	1	15	....	....	328,824	171	154	— 9.9	104	3	44	3	....	971,710
Gulf Coast, Lower	107	90	90	55	4	23	7	1	526,070	272	273	+ 0.4	187	6	62	15	3	1,598,838
Southwest Texas	82	39	54	29	....	23	....	2	189,149	189	145	— 23.2	80	2	59	2	2	488,613
South Central Texas	16	10	17	3	....	14	....	....	51,305	63	41	— 34.9	14	1	26	....	....	83,867
West Virginia	56	72	64	12	41	8	....	3	186,762	171	190	+ 11.1	33	115	25	....	17	517,090
Wyoming	10	4	10	6	1	3	....	....	35,181	24	21	— 12.5	15	1	5	....	....	79,311
Total United States	2,492	2,032[10]	1,826	956	149	442	202	77	6,001,142	6,505	6,145	— 5.5	3,438	509	1,424	568	206	19,295,141

[1] Wells completed in 5 weeks, or 35 days, ended March 28, 1942. [2] Wells completed in 5 weeks, or 35 days, ended March 29, 1941. [3] Wells completed in 4 weeks, or 28 days, ended February 21, 1942. [4] Water input, gas injection, distillate, and salt water disposal wells. [5] Figures from Tennessee Division of Geology. [6] California figures from American Petroleum Institute except for February and March, 1942. [7] Figures from Missouri Geological Survey. [8] Bradford and Kane-Clarendon, Pennsylvania, figures from The Producers Monthly. [9] Data on new wells from Illinois Geological Survey beginning January, 1942, except for March. [10] Illinois statistics for February revised to embody State Geological Survey data on new wells.

a month ago, among these were: Illinois with 85 against 71; Indiana 38 compared with 33; Kansas 141 against 111; Michigan 69 compared with 64; Pennsylvania 215 against 208, and West Virginia with 139 in contrast with 135. Other states showed practically no changes, including Louisiana with 128 compared with 130; Arkansas 22 against 23; New Mexico 71 compared with 74. States showing losses in wells drilling the past month included Texas with 655 against 676, and California with 110 in contrast with 123.

In the five weeks ended March 28, 1942, only 1826 wells were completed in the United States. That number was considerably less than the 2032 wells completed in the preceding shorter period of four weeks that covered February development. The completions of March averaged only 52.2 daily, the lowest rate since March, 1934. In February, 1942, completions had averaged 72.6 daily, and in January 81.7 per day. Present activity is only about one half as great as that of last summer and fall, as completions consistently averaged approximately 100 per day from July through November, 1941.

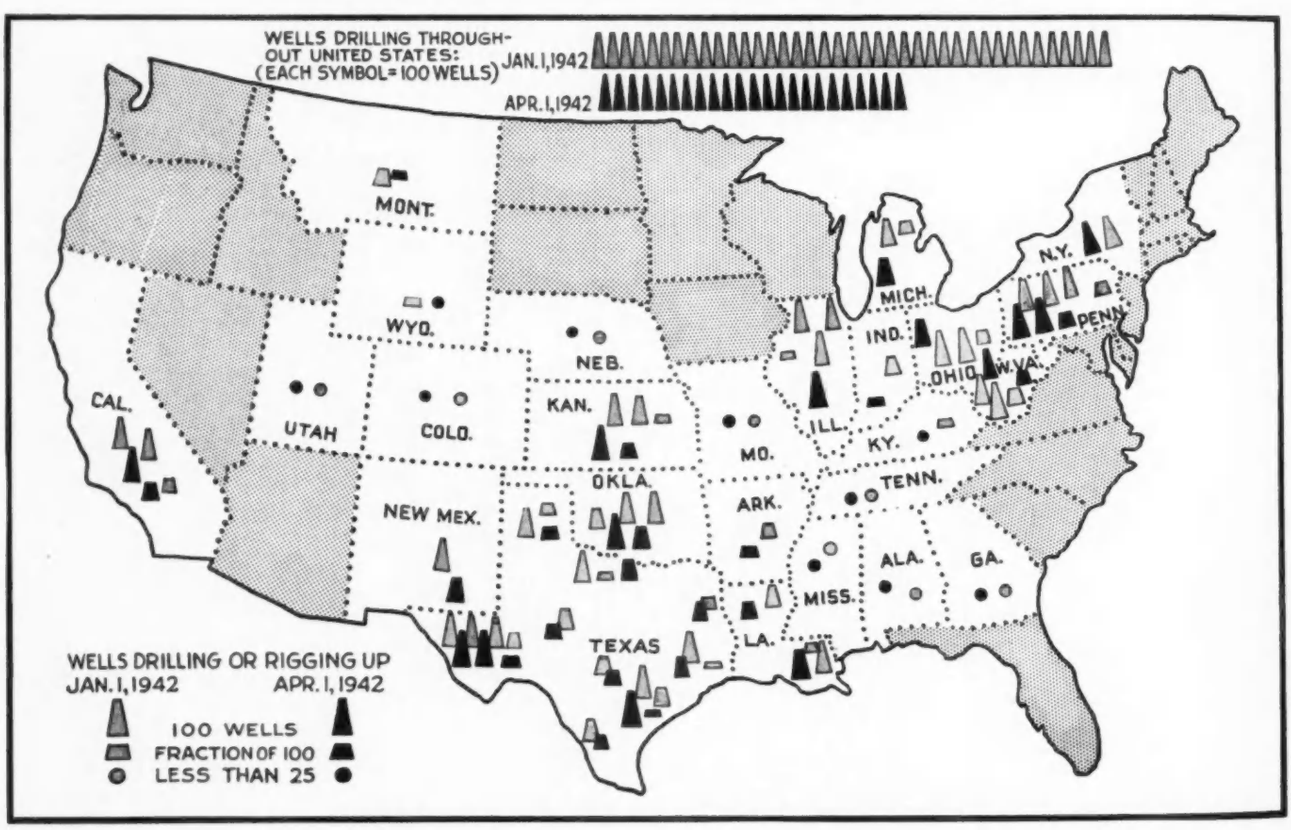
Leveling off of the decline in wells drilling indicates the sharp drop in completions is due to slacken also, for completion rates within time naturally follow the course of drilling activity.

Total wells completed during the first quarter of 1942 amounted to 6145 in contrast with 6505 during the corresponding period of the preceding year, a decline of 5.5 percent. Footage drilled in finishing March completions amounted to 6,001,142 feet, and brought the year's total to 19,295,141 feet.

Wells Drilling Off Only Slightly From Month Ago

STATE OR DISTRICT	TOTAL RIGS IN OPERATION (Drilling, Rigs Up, Shutdown)				DETAILS OF APRIL 1, 1942 FIELD ACTIVITY					
					Rigs in Operation			Prelim. Activity		
	Year Ago April 1, 1941	Month Ago Mar. 1, 1942	Now, April 1, 1942	Percent Change From Year Ago	Drilling	Rigs Up	Shutdown	Derricks	Locations	Total Operations
Alabama	7	5	5	— 28.5	3	....	2	2	....	7
Arizona	7	....	....	....	....	....	....	....	....	....
Arkansas	31	33	33	+ 6.4	22	1	10	8	14	55
California	253	218	198	— 21.7	110	38	50	....	71	269
Colorado	29	22	22	— 24.1	2	....	20	....	2	24
Florida	2	2	2	....	....	....	2	....	....	2
Georgia	4	....	1	— 75.0	1	....	....	....	....	1
Illinois	302	140	139	— 53.9	85	18	36	....	46	185
Indiana	79	46	47	— 40.5	38	1	8	....	21	68
Iowa	4	1	1	— 75.0	....	....	1	....	....	1
Kansas	253	125	157	— 37.9	141	5	11	17	18	192
Kentucky	31	18	19	— 38.7	12	2	5	....	....	19
Louisiana	187	159	162	— 13.3	128	16	18	25	101	288
North Louisiana	67	44	66	— 1.4	44	8	14	16	20	102
South Louisiana	120	115	96	— 20.0	84	8	4	9	81	186
Michigan	152	130	133	— 12.5	69	21	43	8	87	228
Mississippi	31	18	12	— 61.2	5	1	6	1	2	15
Missouri	15	5	5	— 66.6	1	....	4	....	1	6
Montana	44	54	64	+ 45.4	20	6	38	....	3	67
Nebraska	27	24	24	— 11.1	9	2	13	2	1	27
New Mexico	100	123	124	+ 24.0	71	4	49	....	11	135
New York	63	125	127	+ 101.5	85	21	21	8	20	155
Ohio	267	154	108	— 59.5	78	11	19	7	18	133
Oklahoma	346	246	223	— 35.5	156	15	52	16	27	266
Oregon	2	....	....	....	....	....	....	....	....	....
Pennsylvania	372	289	296	— 20.4	215	32	49	17	48	361
South Dakota	....	2	2	....	....	....	2	....	....	2
Tennessee	8	5	4	— 50.0	3	1	....	....	1	5
Texas	1,266	884	842	— 33.4	655	40	147	31	510	1,383
East Texas Border Co's	16	10	5	— 68.7	3	....	2	1	....	6
East Texas Field	21	....	2	— 90.4	2	....	....	....	....	2
Rest of Eastern Texas	68	45	35	— 48.5	22	3	10	3	5	43
North Texas	199	97	105	— 47.2	71	4	30	2	104	211
West Central Texas	95	59	52	— 45.2	34	2	16	1	20	73
West Texas	334	300	273	— 18.2	224	10	39	5	164	442
Texas Panhandle	97	57	52	— 46.3	37	5	10	5	13	70
Gulf Coast, Upper	128	91	83	— 35.1	75	5	3	4	62	149
Gulf Coast, Lower	179	130	133	— 25.6	113	5	15	5	70	208
Southwest Texas	76	48	57	— 25.0	44	3	10	3	43	103
South Central Texas	53	47	45	— 15.0	30	3	12	2	29	76
Utah	4	5	3	— 25.0	1	....	2	....	1	4
West Virginia	176	186	190	+ 7.9	139	20	31	13	34	237
Wyoming	59	48	36	— 38.9	14	1	21	....	11	47
Total United States	4,121	3,067	2,979	— 27.7	2,063	256	660	155	1,048	4,182

Drilling Decline Since First of Year Has Been General



War Council

[Continued from page 14]

of the interior is effective in relieving the situation by reducing the shortage reflected against the East Coast is that it releases all forms of transportation and provides nearer sources of supply for the East Coast," the committee pointed out. "However, such rationing reduces consumption in the interior by 50,000,000 barrels in order to provide 22,000,000 barrels additional supplies to the East Coast."

But even if the East Coast is rationed and maximum use is made of all transportation facilities, both as they exist and can be coordinated by the removal of bottlenecks, it was pointed out, the seaboard area still will be dependent upon tanker deliveries to the extent of 400,000 to 450,000 barrels daily.

"If it is impossible to rely on receiving this amount by tanker the major pipe line construction will be necessary," it was held. "It is the considered opinion of this committee that the magnitude and field of action of the nation's war effort may well require the diversion of virtually all of the industry's tankers by the end of this year."

Tanker Situation Critical

The existing and indicated shortage in tankers "is critical and requires immediate and drastic measores to avoid disastrous results," the report warned.

"Substitute methods of delivery to the East Coast are being used to a remarkable extent, but they are not now adequate, and in the near future can not offset the estimated reduction in tonnage.

"Rationing of all non-essential consumption is indicated as immediately necessary for the East Coast and other areas normally served by tanker-borne petroleum supplies. To accomplish this, it is necessary at least to reduce gasoline consumption on the East Coast and in the Pacific Northwest to 75 percent of 1941 consumption, and fuel oil used for heating to 90 percent of estimated 1942 consumption assuming a normal winter, and to carry out certain conversions from fuel oil to coal and, further, to reduce tanker deliveries to Canada and South America on a proportionate basis.

"Since the above degree of rationing will not eliminate the probable shortage additional rationing in other parts of the country seems necessary wherever it will result, either directly or indirectly, in a saving of transportation which would be available to help equalize the impact of the overall shortage.

"In view of the large degree of rationing which is evidently unavoidable, no time should be lost in putting the necessary rationing measures into effect, since any delay will accentuate the degree of rationing ultimately required. It is further recommended that the probable necessity of rationing fuel oil supplies to domestic consumers be announced promptly so that steps will be taken to improve home insulation and heating plant efficiency and encourage conversions to coal. Corresponding adjustments in crude production, refinery runs, and product yields should be made promptly to keep operations and stocks in better balance, and thus avoid more drastic adjustments later.

"Even with the completion by the end of the year of contemplated facilities to increase non-tanker transportation, the East Coast will still have to rely on tanker transportation to the extent of 400,000 to 450,000 barrels daily to supply essential demands. The only way in which the East Coast can be rendered independent of tanker transportation is by constructing major new pipe lines from District 3 to District 1.

"In view of the uncertainty of available tanker transportation for commercial services the committee urges not only immediate rationing along lines above discussed, but also prompt consideration of the necessity to build additional tankers and to construct new major pipe lines to the East Coast."

Wants Rubber for Civilian Use

The rubber program outlined by the council calls for government financing and the provision of priorities for the necessary plant material. A committee resolution asking such assistance, sponsored by W. S. Farish, president of Standard Oil Company (New Jersey), dwelt upon the desirability of expanding the rubber program so as to add to the 700,000 tons which is to be earmarked for military usage an additional quantity for civilian use to keep automobiles on the road.

Furthermore, it was declared, "the effectiveness of the petroleum industry in providing vital war materials such as aviation gasoline, toluene, lubricating oils, and fuel oil will be impaired, or even destroyed, if the operation balance of the industry is permitted to be upset through the shrinkage of gasoline demand below critical levels."

Roundup

[Continued from page 13]

barges now under construction in three lots of five each in yards on the Atlantic, Gulf and Pacific coasts. Their use as a means of transporting oil was suggested last summer at the hearings of the Maloney committee on the oil "shortage" which then existed. The new barges, however, will be somewhat different in design, it is understood.

Railroads Refuse to Lower Petroleum Rates

Request of the Office of Price Administration that the increased freight rates on petroleum last month approved by the Interstate Commerce Commission be eliminated was rejected this week by the traffic committee of the Association of American Railroads, as was a similar application of the Office of Defense Transportation.

"Representations made by the Office of Price Administration are not such as to justify the railroads in eliminating the increases permitted by the commission on the specified commodities and they cannot assume the responsibility of so radically reducing their present revenues," it was declared by A. F. Cleveland, head of the committee.

Referring specifically to the dozen commodities on which OPA and ODT sought to halt increases, the railroads took the view that any increases in prices caused by the higher freight rates "are not in the category of speculative, unwarranted or abnormal increases in prices such as the Office of Price Administration was presumed to prevent."

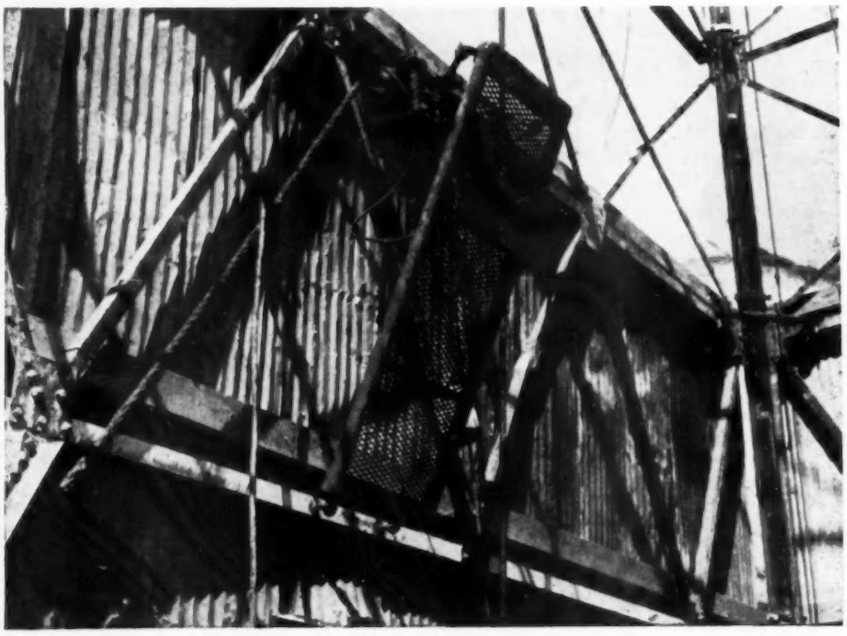
PRACTICAL OPERATING *Hints* FOR

THE practical operating hints for the drilling rig, production man and pipeliner, appearing regularly in these pages, are secured from oil operations everywhere and offer suggestions that will help to improve operating efficiency and safety.

The items give an excellent picture of the remarkable ingenuity being exercised by the operating divisions of the industry. Contributions to these features will be paid for at the rate of $5 for each illustrated item accepted. Address contributions to "The Editor, The Oil Weekly, Houston."

1. MAINTENANCE SAFETY

Hinged Platform Provides Secure Standing From Which to Lubricate and Check Swivel



Carried on the first derrick girt and supported in operating position by wire lines, this expanded metal staging for swivel work-overs may be raised to clear work space when not in use.

AT FREQUENT intervals during the drilling of a well the swivel bearings, packing glands, and other moving parts must be lubricated and serviced. Ordinarily this is done while drilling operations are temporarily suspended, and the kelly is in the rat hole. On heavy drilling units the swivel, even when the kelly is standing in the rat hole, is higher than a man can comfortably reach, and to use a step ladder on the slippery floor often brings on additional hazards.

A company drilling in the Ventura field of California solves this problem by building a small platform that can be lowered to a horizontal position over or beside the swivel in such a position that the man can readily do the service work without much climbing.

Built up out of welded 2-inch pipe and smaller cross members, the 2- by 7-foot platform is supported on the derrick end by two eye-bolts secured to the inside of the lower girt. Flooring of expanded metal screen provides a firm and non-skid surface from which to work without hazard.

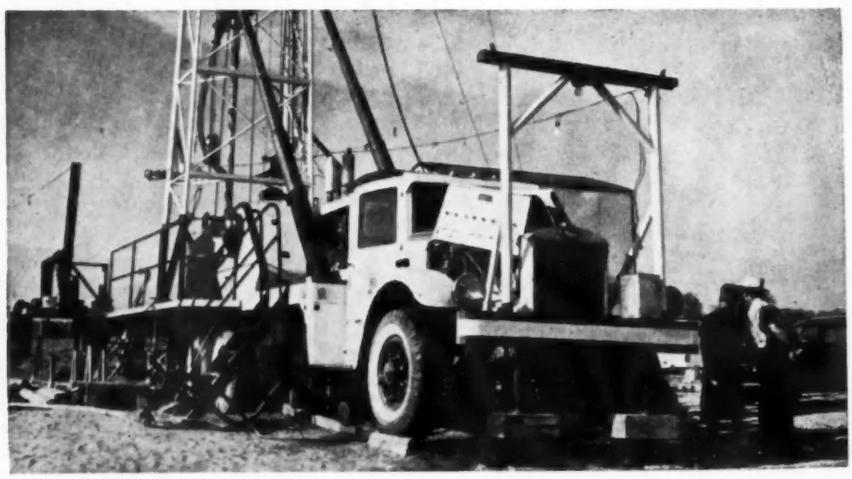
The platform is raised and lowered by a length of old catline running over a pulley tied to the second girt. When extended out in the horizonal position, however, the walkway is supported by a steel cable anchored to each of the two outer corners and tied permanently to the second derrick girt.

2. SLIM HOLES

Support for Front of Truck Drilling Unit

STABILIZING the front end of a heavy duty truck transporting and serving as operating base for a portable string of drilling tools used in slim-hole work not only maintains the alignment of the drive, but also assists in prolonging tire life by freeing the front wheels of vibration, load and sustained distortion at one spot in the circumference of the wheel.

The jack employed to relieve the front end load consists of a pair of screw-type units connected by cross bracing and arranged for unit operation to permit levelling from uneven blocking. The entire bracing unit is raised by jack operation, the threaded end being downward



Inverted screw jacks in unitized mounting provide for lifting weight of front end of truck, stabilizing the unit and relieving tires of concentrated load or continued distortion in one spot.

to protect it from damage and clogging by falling dirt.

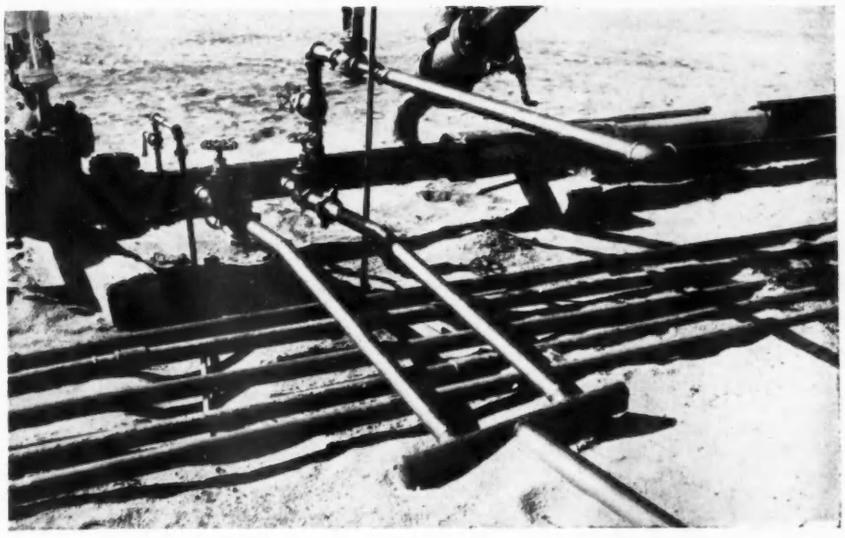
To forestall any shifting of the adjustment, the jacks are set so that a long bar may be run through the lever openings in the screw heads and both screws thus locked together and any effect of vibration thereby nullified.

3. STEAM LINES

Dual Feeds Reduce Scale Choke at Valves

main header are permanently installed, but quick-acting unions several inches down stream from the gates provide quick means of breaking down the smaller steam lines when the assembly is being readied for safe moving to another location.

With the present set-up, there is not so great a chance for both of the valves to become clogged up simultaneously, at least until the well is completed, after which all the lines usually are checked for scale or damage before setting up at the next location.



Scale accumulations at pinched throttle of feed-water pumps are eliminated by use of paired valves, enabling one to be run with more aperture than when larger single valve is used.

TO FORESTALL the possibility of shutdown during drilling operations because the feedwater pump becomes "starved" for steam due to clogged lead lines, one company takes the steam off at the main boiler header through a double line.

It was found that while drilling in some areas where the water is alkaline and scale-forming, the take-off line to the pumps would become clogged by such scale and alkaline deposits.

In the changed set-up, steam is now taken off through two 2-inch lines instead of a single 3-inch. The two smaller lines are approximately 10 feet long, and are welded into a 3-foot header of 3-inch pipe, from which point the steam goes on to the feed water pumps through the usual 3-inch line. The 2-inch nipples and gates taking off from the

4. V-BELT CARE

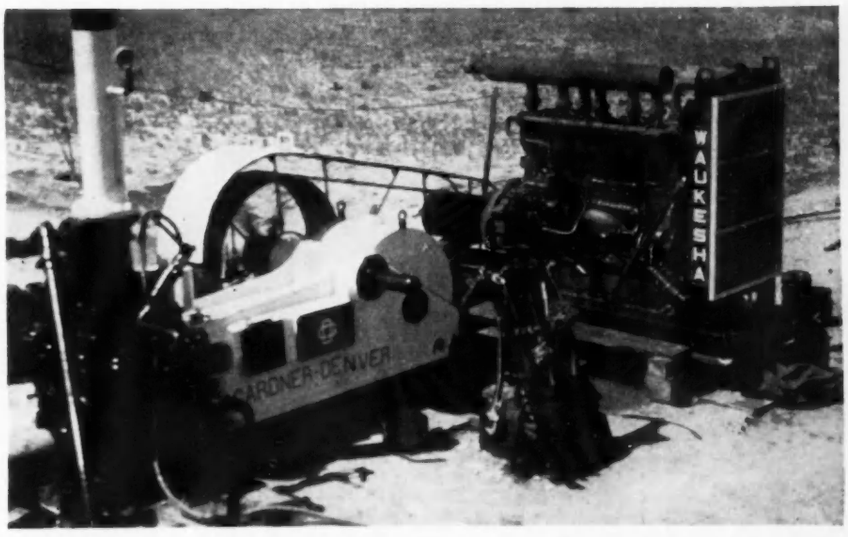
Shield Cuts Weather and Injury Hazards

MORE V-belts are probably wrecked before delivering their normal service life through accidental injury and exposure to the elements than through any other causes.

Recognizing the need for securing ultimate service from his drives, one drilling contractor sets up a cover over each drive. The cover consists of a formed sheet of light steel, curved at the ends to extend halfway down the two drive pulleys, and provided with sufficient braces along the side to afford structural strength to protect the drive from dropped tools or other falling objects.

This solid cover, set close to the belts, also serves to cut off the direct sunlight, and thus prevent dry-checking or hardening of the belt prematurely.

The open braces provide ample opportunity for belt inspection, it being necessary only to remove the supporting members when replacing a belt. Ample clearance is provided at the ends of the guards to permit lateral shift of either unit for the purpose of insuring desired belt tension and for proper alignment of both sheaves.



Formed from sheet metal heavy enough to withstand impact, this shield protects V-belts from injury and from sun curing, without restricting or preventing inspection or tightening of drive.

OIL FIELD SCRAP AND SALVAGE

Don't Overlook Rope In Scrap Programs

Not to hang the enemy, much as that is to be desired. But, with the Philippines and other normal sources of supply of manila and other fibres cut off by Jap aggression, there is a shortage not only of the long fibre required for rope making, but also of the even greater quantities of short fibre produced with the long, and received as by-product in rope making.

This short fibre is required as binder in making insulating papers, and stocks are already so far behind requirements that WPB has inaugurated a drive to get in all scrap rope, line and cable of manila and other fibre.

The oil industry, especially in the drilling department, is a large user of manila line, and much worn-out rope is thrown away, burned, or at best, used to make standings at the drawworks or in the doghouse. This rope should be dried carefully, and then saved against the time when machinery will be set in motion to afford its collection and forwarding through usual trade channels. Meanwhile, saving of worn-out rope assumes importance second only to the prolonging of life of line now in service.

Oklahoma Combats Scrap Whispering Campaign

Oklahoma's domestic scrap campaign, in which oil-field scrap is sought along with that from homes, farms and small industries, has had to combat a whispering campaign which compared the effort to the ill-advised and often abortive aluminum drive. Oklahoma's campaign, unlike the aluminum fiasco, relies on the normal trade channels to move accumulated scrap to the ultimate goal of furnace or foundry cupola. With such a set-up, and a most serious shortage of scrap, it is to the dealers' advantage to move accumulations as fast as sorting and grading can be completed, their payment not being forthcoming until shipment is actually made. Backers of Oklahoma's scrap collection campaign may draw comfort from the fact that whisperers have decried their efforts: unless the campaign had promised worthwhile results, it would have been passed over as not worth the effort of slow-down opposition.

SCRAP NOTES

Check of many scrap dealers participating in the Texas campaign show that intangible expenses such as trucking, sorting and loading labor and cash outlay incurred directly in moving the collected scrap, the dealer contributed at least $1.00 and often the entire $2.50 allowed as preparing charge on each ton he moved during the height of the campaign. This was because most dealers, in their desire to cooperate in the immediate relief of the shortage at the steel mills, refused to lay aside the customary percent of material for possible or ultimate salvage—preferring rather to forward the entire tonnage and thus indirectly contribute considerably toward the move to keep the steel mills in blast.

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With new material shortages developing overnight, and the government launching new scrap campaigns to relieve them, the best advice to the man checking old equipment is "When in doubt, don't—throw anything away!"

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Contrary to the idea held in some quarters, no increase in price from the scrap dealer is obtainable for breaking down drilling chain into separate pins, bushings and side plates. Some chain makers use the same analysis steel for all parts, varying only the heat treatment to bring out desired physical differences in the parts. In any case, the amount of variation introduced in an open-hearth furnace melt by use of all of a discarded, worn-out chain, in place of that obtained through the use of an individual chain component is so slight as to be insignificant. If chain be dismantled before selling as scrap steel, it should be done solely with the idea of sorting out and saving for replacement use, such parts as still retain hours of service as fill-in parts in an overhauled chain.

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Although individually not much heavier than a No. 2 tin can, automobile license plates are not tinned, and therefore become satisfactory additions to the Nation's steel scrap pile. At least two of the larger oil companies, through their retail outlets, are collecting plates from motorists and turning them in through usual scrap channels. Companies having transportation or service departments can be of some assistance if they will collect and turn in the old plates from company cars. In some instances these plates are called in to guard against possible fradulent use and in others all company cars are given new tags only when brought to the central service point. In such cases salvage of the tags will result in surprisingly large amounts of steel being saved for remelting. Tags, wired in bundles, are easily handled through scrap channels and into furnace charging boxes.

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Government condemnation and seizure of scrap yards, auto "Graveyards," and factory waste material inventories emphasize the need for scrap and the determination of those in authority to get in the scrap and to keep it moving until it reaches the mills. Any hoarded scrap, whether on the lease, in the scrap dealer's yard or individually held on speculation is against National war policy, and should be moved through normal channels, *at once*. Confiscation or Governmental coercion is at best a slow process. Even though not involving a sacrifice, cooperation in present scrap campaigns is a patriotic duty.

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Replacement of gulley crossings made from random joints of old pipe with boxed timber culberts on one lease in East Texas resulted in the freeing of nearly half a carload of scrap, and enabled the lease roads to be graded to uniform level. Much pipe now used in culverts, cattleguards and as riprap below corduroy roads can—and must—be salvaged to free the scrap metal therein for steel making.

Airplanes Help Locate Scrap Accumulations

Wichita, Kansas, introduced a modern note in the scrap collection campaign by sending out three patrols of four planes each to make an aerial survey of the terrain around the city to locate piles of abandoned junk, discarded automobile bodies and other steel which would justify an effort to collect and start it through trade channels. Each plane was assigned a specific area to cover, and in addition to the pilot, carried a qualified observer to spot the scrap and make note of its location, as a preliminary to dispatching a truck and ground crew to perform the actual salvage operation.

SCRAP FROM PANHANDLE FIELD

300 tons of oil field scrap in the Borger collection center awaiting railroad cars and early shipment to the steel mills. This amount of scrap, when sorted, graded, bundled and prepared, will enable the mills to turn out from five to six hundred tons of badly needed war effort steel, and better than a hundred tons of iron castings, many of which will find their way into imperative oil industry applications.

The Week's News

Special Hearing Set on Arkansas Allowables

A special hearing to set allowables for Arkansas oil and gas fields for May will be held at El Dorado April 22, the Arkansas Oil and Gas Commission announced last week.

Other matters to be taken up include the gas-oil ratio of the Atlanta field, adoption of a new proration formula for the Dorcheat field, a decision on the question of permits for multiple-zone or dual completion of wells during the war, and a presentation of evidence complaining of the operation of the Schuler-Jones sand unit.

A commission spokesman said that while all fields in the state are operating with a minimum of waste, adjustments are necessary to meet requirements of the allowable set by Petroleum Coordinator Ickes. The state's allowable recently was reduced from 80,000 to 71,500 barrels daily.

Texas Hearing Called At Austin April 20

The Texas Railroad Commission has scheduled its next statewide proration hearing at Austin April 20.

Texas Panhandle Allowed More Producing Days

In response to the request of the Petroleum Coordinator, the Texas Railroad Commission has adiusted its April shutdown order to allow the production of 83,428 barrels of oil on each calendar day from the Texas Panhandle. The commission announced that the action was taken strictly on the recommendation of the Petroleum Coordinator, as a war measure.

The increase was accomplished by reducing from 18 to 10 the number of shutdown days for the Panhandle area. Fields will be closed on April 3, 4, 5, 12, 18, 19, 25, 26, 29, and 30. The telegram from the coordinator, upon which the commission based its action, read as follows:

"Although Panhandle crude is not classed as natural aviation-grade crude, special refining facilities in Panhandle, coupled with supply of natural gasoline and liquefied gases resulting largely from Panhandle production, make possible manufacture 100-octane gasoline or components finished by other refiners.

"Panhandle crude moving to Gulf Coast has long been used as source high-grade lubricants by means processing facilities required for the purpose located in that area. It is now a key source of aviation lubricants and toluene which are equally important as aviation gasoline.

"Arrangements have been made to divert, if necessary, as temporary measure during April, some Panhandle crude to local refining facilities out of supply moving to Gulf Coast. Necessary supplies Panhandle crude must be made available both to local facilities and to facilities on Gulf Coast or to make war products. Additional supply Panhandle crude as certified my telegram April 1 required for purposes outlined above which are of vital importance to war program.

"Because increased production certified for Panhandle is small compared with Texas total suggest that adjustment to effect balance to total Texas production of 1,134,000 barrels daily previously certified is not necessary in view of possible difficulties involved in changing schedules or shutdown days in other areas."

Magnolia Lifts West Texas Pipe-Line Proration

Elimination of pipe-line proration in West Texas has been announced by Magnolia Petroleum Company retroactive to April 1, leaving Atlantic Refining Company, Tide Water Associated Oil Company, The Texas Company and Sinclair Prairie Oil Marketing Company as the only buyers with restrictions on the amount of allowable oil accepted for purchase. Magnolia cut its production and purchases to 60 percent of the allowable on March 1 throughout the district and also in Vacuum field, New Mexico. No change was made in the latter field, where its controlled production is moved through the facilities of The Texas-New Mexico Pipe Line Company to Wink, Texas, on consignment to Magnolia Pipe Line Company.

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McLaughlin Appointed to OPC Transportation Post

Appointment of R. B. McLaughlin, vice president and assistant manager of The Texas Pipe Line Company, Houston, as associate director of transportation in OPC, was announced last week. In this position he will work with J. R. Parten, director of transportation.

McLaughlin, born August 30, 1890, at Fredonia, Pennsylvania, started his career in the oil industry with The Texas Company June 1, 1906, at Sour Lake, and has continuously been in the employ of the company until the recent appointment.

He was assigned to the construction office at Dallas in 1907 when The Texas Company started the Gulf Coast-Oklahoma pipe line. After the line was completed in 1908, he was transferred to the general office in Houston, advancing to positions carrying heavier responsibilities.

McLaughlin has been an officer and director of The Texas Pipe Line Company and The Texas-New Mexico Pipe Line Company since their organization.

In 1938, he was appointed chairman of American Petroleum Institute's Engineer-Accountant Valuation Committee to represent the interstate pipe line carriers, and to cooperate with the Interstate Commerce Commission in the valuation of properties of the pipe lines under Section 19a of the Interstate Commerce Act.

He already has taken up his new duties in Washington.

Meanwhile, appointment of Parten as director of OPC's transportation division, succeeding Henry A. Gilbert, was formally announced last week. Parten is president of Woodley Petroleum Company, Houston, and chairman of the board of Premier Oil Refining Company of Texas.

For the past several months Parten

R. B. McLAUGHLIN

has been a member of the Tanker Coordinating Board, set up by OPC and the Maritime Commission to coordinate the operations of tankers. He will continue to serve on the board, but as a government representative instead of an industry member.

Gilbert, who was placed in charge of the transportation division last July, moves up to become a special assistant to the deputy coordinator, a new position made necessary by the vast amount of work requiring the attention of Ralph K. Davies.

Final Arrangements Made for Geologists' Session at Denver

Final arrangements are being made for the joint annual meeting of The American Association of Petroleum Geologists, The Society of Economic Paleontologists, and The Society of Exploration Geophysicists at Denver, Colorado, at the Cosmopolitan Hotel on April 22, 23, and 24, 1942. These societies are uniting their efforts to find new reserves of oil necessary to the needs of industry and the war effort. The Rocky Mountain Association of Petroleum Geologists is serving as host for the meetings, but all arrangements are under the direction of the executive committees of the three national organizations.

Ralph L. Carr, Governor of Colorado, will give the address of welcome at the opening meeting on Wednesday morning. Other speakers will include H. E. Christensen, president of the Rocky Mountain Association of Petroleum Geologists, Edgar W. Owen, president of the American Association of Petroleum Geologists, H. B. Peacock, president of The Society of Exploration Geophysicists, H. V. Howe, president of the Society of Economic Paleontologists and Mineralogists, Wallace E. Pratt, director and member of the executive committee, Standard Oil Company (New Jersey), Carey Croneis of the Walker Museum, University of Chicago, and E. L. DeGolyer, director of conservation, Office of Petroleum Coordinator. The three principal papers to be given on Wednesday morning will be "Good Geologists Make Good Neighbors," by Pratt, "Notes on Present Status of Problems of Exploration," by DeGolyer, and "Geology in War and Peace," by Croneis.

Following these papers, methods of application of geology and geophysics to war and post-war problems of the petroleum industry will be discussed at a joint conference of the A.A.P.G., S.E.G., and S.E.P.M. At this conference an examination will also be made of the emergency requirements for the various types of oil, distillate, and petroleum products, and how these requirements may be met most effectively in the several oil provinces by the application of geological and geophysical technique.

On Wednesday evening, a limited group composed of the national service committee, the chief geologists and geophysicists of the large oil companies, or their delegates, and the district representatives of A.A.P.G., will meet to discuss the emergency problems of personnel. The subjects to be considered at this meeting will probably include the proper scope of requests for selective service deferment; the temporary employment of technical men to fill the vacancies left by men going into military service; and readjustment of personnel to meet emergency requirements. William B. Heroy, president of Pilgrim Exploration Company, Houston, Texas, and past president of A.A.P.G., will be chairman of this conference.

The last two days of the convention will be devoted to presentation of technical papers by members of the three societies. Preconvention sessions to be held Tuesday afternoon will be the meetings of the business, standing, and special committees. Problems of geology to be discussed at these meetings will include "Origin of Oil," "Migration and Accumulation of Oil," "Oil-Field Waters," "Sedimentation," and "Relation of Oil Analyses to Stratigraphy." The research committee conference, headed by A. I. Levorsen, Tulsa, chairman, will be held on Tuesday evening to consider the subject of "Oil-Discovery Methods."

The annual exhibits of laboratory and field exploration methods and apparatus, and a display of educational and technical equipment, which will be on the mezzanine floor of the Cosmopolitan Hotel, should be especially significant and important this year.

"It is believed that the need for meetings is greater than ever before and that a great deal can be accomplished by a thorough study of the conditions which the war has imposed upon the oil industry," Owen, A.A.P.G. president, commented.

"Adjustment of the scientific and technical resources of the three societies to meet the changing conditions will be uppermost in the minds of the men attending the meeting. Time, energy and expense of every convention activity will be directed toward the accomplishment of constructive work which will increase the effectiveness of the geologists, geophysicists, and paleontologists in their participation in the war effort."

Committee Chairmen, A.A.P.G. Annual Meeting, Denver, April 22, 23, 24, 1942

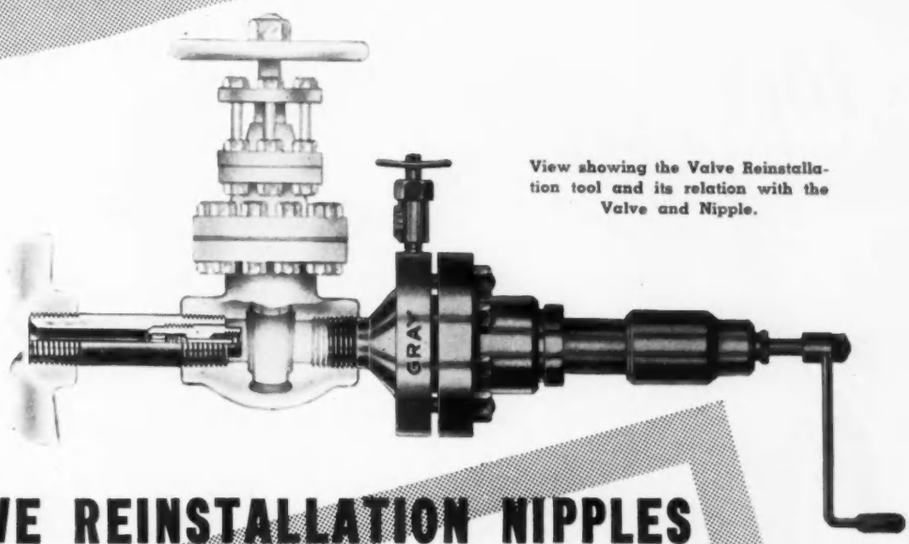
Seated, left to right: C. E. Erdmann, vice president, Rocky Mountain Association of Petroleum Geologists; H. E. Christensen, president, Rocky Mountain Association of Petroleum Geologists; C. E. Dobbin, general chairman; F. M. Van Tuyl, Eastern Slope trips; A. E. Brainerd, technical program. Standing, left to right: W. A. Waldschmidt, publicity; C. A. Heiland, Society of Exploration Geophysicists; C. M. Rath, registration; W. O. Thompson, educational exhibits; C. S. Lavington, hotels; H. W. Oborne, entertainment; J. H. Johnson, Society of Economic Paleontologists and Mineralogists. Chairmen and officers not present: H. A. Stewart, finance; J. W. Vanderwilt, Western Slope trips; T. S. Harrison, reception; Don B. Gould, vice president, Rocky Mountain Association of Petroleum Geologists; R. D. Copley, secretary-treasurer, Rocky Mountain Association of Petroleum Geologists.

Corrosion Conference During PIEA-PESA Convention

A special corrosion conference will be held by the Cathodic Section during and following the annual convention of the Petroleum Industry Electrical Association at Shreveport, April 22 and 23. The program will cover both technical and practical subjects. Petroleum Electrical Supply Association meets on the same dates, all sessions being at the Washington-Youree Hotel. The Cathodic Section will have an added session April 24.

The opening session Wednesday morning, April 22, will hear the report of C. O. Diller, president of PIEA, and other business matters. In the afternoon, with F. W. Littell as chairman, will hear a paper, "Co-axial Cable Development," by K. C. Black, Bell Telephone Laboratories, followed by discussion. During the same period the Cathodic Section will be hearing papers on "When and Where to Use Insulating Flanges," by

HERE'S HOW TO *Salvage* THAT CASING HEAD VALVE



View showing the Valve Reinstallation tool and its relation with the Valve and Nipple.

with GRAY VALVE REINSTALLATION NIPPLES

TO INSTALL THE NIPPLE, the valve and regular nipple are removed while no pressure exists between the strings. The reinstallation nipple and its plug are then screwed into the outlet in place of the part removed. The plug in the nipple is tapped for a gauge cock and carries in it a back pressure valve which is automatically opened when the gauge cock is properly screwed into the plug. This allows pressure to be noted at any time or continuously. These nipples and plugs are not recommended for valve removals.

TO INSTALL A VALVE ON AN OUTLET EQUIPPED WITH A GRAY VALVE REINSTALLATION NIPPLE, remove the gauge cock or plug from the hexagon-headed plug in the nipple, attach a gate valve or plug valve to the nipple by means of a thread provided on the end thereof, into the outside end of the valve screw the reinstallation tool through the valve, open the valve, project the stem of the reinstallation tool through the valve, engage the plug and back same out of the nipple. The plug is then retracted through the valve, the valve closed and the tool and plug removed. This leaves the outlet equipped in the usual manner with a valve so that pressure in the casing may be bled off or mud or cement pumped in between the casing strings.

GRAY
TOOL COMPANY
HOUSTON, TEXAS

West Coast Distributor: WAGNER-MOREHOUSE, INC., Los Angeles

W. E. Huddleston, Cities Service Gas Company; "Maintenance Requirements for Adequate Operation of Cathodic Protection Equipment," by Donald H. Bond, The Texas Pipe Line Company, and "Cathodic Protection of Tank Farms," by R. A. Brannon, Humble Pipe Line Company.

Thursday morning, with H. C. Gear as chairman, papers include "The Economic Justification of Cathodic Protection," by L. F. Scherer, The Texas Pipe Line Company; "Cathodic Protection of Distribution Systems," by Ray M. Wainwright, Montana-Dakota Utilities Company, and "Cathodic Protection and Corrosion From Management's Viewpoint," by N. G. McGowen, United Gas Pipe Line Company. Thursday afternoon, with D. H. Levy as chairman, subjects will include "The Partnership of Light and Darkness in Military Defense," by S. G. Hibben, Westinghouse Electric & Manufacturing Company, and "Conserving Our Greatest Asset," by C. L. Hightower, United Gas Pipe Line Company.

Cathodic Section

The Cathodic Section on Friday morning will consider "Current Density Determinations on Refinery Piping," by Derk Holstein, Shell Oil Company; "Corrosion Problems on Refinery Equipment," by V. L. Nealy, The Texas Company, and "Recent Progress in Practical Applications of Cathodic Protection," by G. R. Olson, United Gas Pipe Line Company.

IT'S THE LITTLE THINGS THAT *REALLY* COUNT

Thread Protectors; just "little things," but very important now that America is at war. Use them, after doping, on the pin and box ends of all storage racked strings. You'll get longer life, better service, when those strings are put to work. Save your extra protectors to turn in on defense metal drives. And remember: Do not loosen protectors by pounding. Use a wrench to loosen, and unscrew by hand. Do not remove protectors until rods are hanging in the derrick.

Here are some other "little things"—ways that you can help conserve metal, ways you can insure the production so vital to our boys in the Armed Forces. 1. Be sure pins, boxes and shoulders are clean before stabbing. 2. Use new pony rods on new strings. 3. Do not hammer couplings—use snap wrenches. 4. Be sure all joints are TIGHT when rerunning (use 36″ snap wrenches, except on ⅝″ rods where regular snap wrenches will do).

Thousands of "little things" have played a part in the steady improvement of JoneSuckeRods. Jones Engineering, Metallurgy, Well Studies and Laboratory Research have always considered *all* problems, large and small, thus maintaining sucker rod leadership for 51 years.

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One Gulf Coast Plant Closed, Others to Follow

Continued tanker losses by submarine action in Atlantic and Caribbean waters, government requirements for additional tankers, and severe restrictions on consumption along the Atlantic Seaboard have forced The Texas Company to close its 23,000-barrel Houston refinery, J. S. Leach, vice president of the company, announced last week.

Leach said it is not possible to determine at this time how soon normal operations at the plant can be resumed.

Personnel of the plant will be greatly reduced, the announcement said, and employes who are retained will maintain equipment and operate a terminal.

"Our company alone has lost several ocean-going tankers. Some of these were sunk by enemy action. Others have been requisitioned by the government for the duration of the war. Gasoline consumption in the East has been heavily curtailed. Under the circumstances, we had no choice but to suspend operations at the Houston refinery," the announcement said.

Meanwhile, reports were circulated that some additional plants not producing essential war materials may be closed because of lack of transportation facilities to the East Coast which has resulted in filling of storage tanks.

It is understood that none of the large refineries would be closed. Conferences between government officials and refiners already have been held, it is reported, and an agreement reached whereby profits from those plants that will operate will be pooled and shared on a pro rata basis.

Speed Buys Guinn Oil Properties at Hull

Carleton D. Speed, Jr., has purchased the properties of Guinn Crude Oil Company in the Hull field, Liberty County, Texas, consisting of 6 wells with settled production of 85 barrels daily, and 1 well temporarily abandoned. Consideration involved in the deal was not revealed. It is understood that reworking operations will begin on some of the wells at an early date.

Speed also has announced that he has personally acquired, as of early December, all of the assets of Speed Oil Company including production. Speed Oil Company will continue to exist as an inactive company for the time being. Speed plans to operate in his own name.

Five Tribes Lease Sale April 14

Bids for oil and gas leases will be received April 14 on lands of the Five Civilized Tribes, by A. M. Landman, superintendent, Muskogee. Two tracts in Washington County, of 30 and 20 acres each, are being offered, one in Creek County of 160 acres, eight in Okfuskee County with a total of 460 acres, an 80- and a 77½-acre tract in Hughes County, 400 acres in Seminole County in seven tracts, eight tracts in Garvin County totaling 740 acres, 350 acres in four tracts in McClain County, and 228 acres in two Stephens County tracts. One piece in Love County is of 180 acres, two in Marshall County total about 216 acres, and one piece of 120 acres is offered in Jefferson County.

Optimism and Cooperative Spirit Pervades Eastern A P I Session

A DETERMINED optimism and a general agreement that the oil industry is sinking rivalries and subordinating individual gain in prosecuting the war characterized the annual meeting of the Eastern District Division of Production of the American Petroleum Institute held last Thursday and Friday in Pittsburgh, Pennsylvania. This feeling was forcefully expressed by Walter S. Hallanan, president of Plymouth Oil Company and chairman of OPC oil production committee for District 1, who declared that "Individual problems come last as the oil industry concentrates on the common problem of winning the war to save this nation."

Officers elected for the Eastern District, API Division of Production for the coming year include M. G. Gulley, Gulf Oil Corporation, Pittsburgh, chairman; K. B. Anderson, Columbian Carbon Company, Charleston, V. F. Bowyer, Peoples Natural Gas Company, Pittsburgh, R. E. Damp, The Carter Oil Company, Mattoon, Illinois, W. E. Ferguson, Ohio Fuel Gas Company, Columbus, Ohio, and C. C. Irby, Turner Petroleum Company, Mount Pleasant, Michigan, vice chairmen; J. V. Goodman, Equitable Gas Company, Pittsburgh, secretary-treasurer, and O. W. Van Petten, Columbian Carbon Company, Charleston, chairman of the advisory committee.

Abstracts of papers presented follow:

Responsibility of the Oil Industry in the War

By Walter S. Hallanan, *President Plymouth Oil Company*

We have got to be realistic. The old problems no longer exist. The economic order we knew is no more. There is only one common problem, and that is to win the war to save this nation. Individual problems come last. For the time being, regimentation must be accepted. Opposition to government policies must not be permitted to interfere with prosecution of the war. Oil men of the Appalachian region are plunged into the war as soldiers of supply. The supply is not yet adequate. Steps must be taken today to provide for an increased supply tomorrow. The oil industry faces a problem greater than ever before, that of supplying our own needs and those of our allies. There is no longer any dividing line between the majors and the independents. All stand together in the common purpose.

A fine job has been done by OPC under hard conditions and despite errors. The industry committees are an excellent development of OPC, and it is too bad that all phases of government relations with the industry are not yet centered in one body.

Oil men of the Pennsylvania Grade region must and will produce more oil. We need another 10,000 barrels per day from this region. We can get this by various means that have occurred to most of you. We, of course, face obstacles in the form of taxation, labor troubles and federal rules, but these can be overcome. They must be. They will be, for we have pledged every energy and resource in winning the war.

Responsibility of the Oil Industry in the War

By D. R. Knowlton, *Director of Production, Office of Petroleum Coordinator*

Remarkable indeed has been the change in attitude of oil men since Pearl Harbor. Members of the oil industry thought mainly of their individual interest, but that has changed radically. All are pulling together for the one cause of winning the war. At first, oil men could not see the need for decisions in Washington, but now recognize the fact that there just is not enough steel to go around. They understand the purpose behind order M-68, the aim of which is to keep the industry functioning effectively with the minimum amount of steel and other materials. The War Production Board is naturally concerned with the use of steel in oil production. Oil men should consider that drilling one well in place of two puts two 30-ton tanks on the field of battle.

The oil transportation problem is serious, but is hoped that the industry will not allow current problems to obscure a more critical problem, that of oil reserves. We have about twenty billion barrels in reserve, but new reserves must be found to win this war. The situation is serious. Last year was a good wildcatting year, but new discoveries were disappointing. We need better tools to find oil. All companies are urged to continue basic research in the finding of oil. The 19,000 wells OPC thinks can be drilled this year are about 60 percent of those drilled in 1941. We will be lucky to get steel to drill 19,000 wells this year.

We have to be strict in allowing exceptions to order M-68. We have designated three types of pools as eligible to exceptions to the order, and with these the industry is familiar. The Appalachian area is one of those types. The area is an important part of the war effort and needs to develop its reserves with all help possible. It is felt that applications for exceptions to order M-68 can be processed within a week. The government is anxious to do all possible to help this area in the necessary expansion in the course of war.

Eastern A P I Head

M. G. GULLEY

Natural Gas Industry And The War

By Frank M. Brewster *Director of Natural Gas for District 1, Office of Petroleum Coordinator*

Two federal orders reflect the war situation upon the natural gas industry. These are conservation Order M-68 and Preference Rating Order P-98.

The industry is vitally affected by these orders and is coming to understand them. Many wells in the Appalachian area are being drilled with second hand equipment and therefore are not closely affected by Order P-98, but in drilling other wells the order has to be considered.

It is felt that orders M-68 and P-98, despite difficulties entailed in their application, are well intended and are doing as much as can be done at present in conservation of materials in the prosecution of the war. The orders are directed toward the conservation of vital materials. The natural gas industry is coming to realize the need of strict conservation and is becoming more sympathetic with the orders of those in Washington administering these orders.

Natural Gas Industry And The War

By J. French Robinson, *President East Ohio Gas Company*

The natural gas industry is mobilized for war. It has heavy responsibilities in the production of war equipment and in keeping this equipment moving. The industry is working closely with the various government agencies to meet these responsibilities. Heat is a prime agent in metal working, and natural gas, because of its ease of control, is very important in the provision of heat in war industries. The Pittsburgh, Youngstown and Wheeling regions are filled with such industries, and the natural gas fields in these regions are being taxed to capacity.

Gas reserves in the Appalachian district are slightly over 5 trillion cubic feet. A critical problem is getting the gas from the ground quickly enough to meet present needs. Some gas must be piped into the district from the outside to supplement the local supply. Heat treatment of metals is an exact soience

in which the use of natural gas is widespread. If a special purpose metal is wanted, natural gas is almost sure to be used because of its temperature range and closeness of control. Aside from heating purposes, natural gas is also used in some metal treating processes to provide a gaseous atmosphere. Faced with the responsibility of sharing in the production of basic war materials, the natural gas industry has plunged into an all-out program to coordinate individual companies and assist the government.

Recent Advances in Selective Shooting of Producing Horizons

By Harry M. Ryder
Ryder-Scott Company

In the secondary oil recovery by use of water injection, control of water movement in the sand can be exercised by selective shooting resulting in a good economic advantage. In selective shooting, each individual sand layer within the oil bearing formation is shot, so far as possible, according to its permeability, porosity, oil saturation, water content and other conditions. A study of a large number of properties shows that where groups of wells have been selectively shot, these wells actually produce far more oil than wells not so shot and considerably less excess water is handled for each barrel of oil produced.

Since the sand conditions must be known at each well in order to prepare selective shots, it is possible with this information to exercise competent technical control over water flooding development and operation. The control, through mathematical and other procedure, includes the proper location of oil wells, proper use of packers, proper amount and pressure of water and proper schedule of the initial applications of water pressure, resulting in further increase of oil production and in minimum development and operating costs.

The calculations involved, having been derived from field experience, provide a quite accurate means of predetermining water requirements, the amount of production to be expected, and its time of arrival. The principles involved have application to primary oil production and to natural gas.

Geologic Distribution of Oil In the Illinois Basin

By B. F. Hake
Gulf Refining Company, Indianapolis

The geologic province known as the Illinois Basin is a structural depression situated between four areas of uplift, the Kankakee and Cincinnati arches are on the northeast, the Nashville dome is on the southeast, the Ozarks are on the southwest, and the Wisconsin uplift on the northeast. The Basin includes adjacent parts of Illinois, Indiana and Kentucky. Oil has been produced in the Basin from about 20 identifiable and widespread formations. All the oil-producing formations have the common feature that porosity and permeability within each are highly variable and erratic both as to quality and distribution. The effects of these variations have tended to produce a large number of small fields in each productive zone.

In this study the important producing horizons have been grouped into nine zones. Estimates are presented to show quantities of oil produced from fields developed since January 1, 1937. In the older fields it is virtually impossible to estimate the quantities of oil produced from individual formations. In five years the new fields have yielded about 43 percent of all the oil taken from the basin in 35 years. The fields developed since January, 1937, have yielded up to January, 1942, a total of 394,200,000 barrels from all the nine zones. Production has come almost entirely from three zones, the Lower Chester, Lower Mississippian and Devonian lime, which have yielded respectively 215,200,000 barrels, 110,100,000 barrels and 48,500,000 barrels. Meager information indicates that the total recovery from all fields of the Basin, specifically excluding fields on the Cincinnati arch in Indiana and Kentucky, during 35 years is a little over 900,000,000 barrels.

Deep Rotary Drilling in Michigan

By G. C. MacDonald
Gulf Oil Corporation, Tulsa

Several articles have been published on the deepening with rotary of Gulf Refining Company's Bateson 1, originally a cable-tool hole, in Bay County, Michigan. Some of the more serious problems were not publicized. This paper correlates some individual problems into a general background with primary consideration given to mechanics of drilling.

Much of the time and money spent in drilling the well resulted from a fire and from fishing operations about which little could be done. Since subsurface conditions are known it should be possible to drill a similar well in the same area with a fraction of the cost and trouble encountered. Most drilling difficulties occur above 5000 feet, and if that section were adequately cased off with an intermediate string of pipe, the major portion of the troubles encountered in Bateson 1 would be eliminated.

Certain changes in the mechanical equipment would further increase the ease and safety of drilling additional wells.

A salt water base mud would reduce enlargement through the extensive salt section.

If a mechanical rig is again used even though the engines are high off the ground, a jackshaft or some other means should be provided so that the mud pump would be located at ground level. This would assure flooded pump suction which is desirable in handling mud of 17 or 18 pounds weight. Steel tankage used for circulating and storing mud was invaluable.

Much of the overall time in drilling the well was consumed in remedial or precautionary work because of abnormal conditions which could not be predicted. With conditions recorded, closer design with more reasonable safety factors is possible.

The well was an expensive venture but if the information developed is used in the future in that area, the expense of the venture should be justified if it permits additional wells to be drilled safely, rapidly and economically.

Rotary Drilling in the Appalachian Area

By E. H. Tolleson and W. W. Mayfield
Hope Natural Gas Company

Six deep wells have been drilled with rotary tools in the Appalachian area, which is essentially a hard rock drilling country. Drill-pipe and rock-bit performance is the main factor in determining the practicability of using the method of drilling. Experience shows the method can be used successfully for wells of 6000 feet or more. Reasons for using rotaries in the area are: saving of time, saving of casing, directional control of hole, certainty of completion, and effective control during completion.

The Marshall well of Peoples Natural Gas Company was completed in Westmoreland County, Pennsylvania, in August, 1938, and went to 7777 feet. The same company drilled its Piedmont Coal well near Uniontown, Pennsylvania, to 6825 feet and completed in December, 1938, as a gas well. South Penn Oil Company's Backhaus well was completed as a dry hole in August, 1938, after reaching 7471 feet. Hope Natural Gas Company abandoned in May, 1941, its Gribble well in Harrison County, West Virginia, after drilling to 10,018 feet. The same company drilled its Woofter well in Lewis County, West Virginia, and completed it as a gasser, total depth 7325 feet, in October, 1941. Records of a sixth deep well in Pennsylvania were not available.

It is noteworthy that the Piedmont Coal well shows a general improvement over the Marshall well in all drilling phases. The Wooster well likewise shows an improvement over the Gribble well. These facts indicate conclusively that the drilling crews, after drilling one well in an area, have learned to improve operations on the second well in the same vicinity.

In connection with drilling costs it is hard to make a comparison between any of the wells because of differences in drilling conditions and probable differences in cost keeping. To approximate normal drilling operations, and adjustment of the cost excluding costs of fishing and cleaning out gives an estimated cost per foot that approximates the cost of rotary drilling operations that would be anticipated in developing a field in this area. For this reason it is thought that drilling costs will approach $8.00 per foot for 7000-foot wells through the Oriskany horizon.

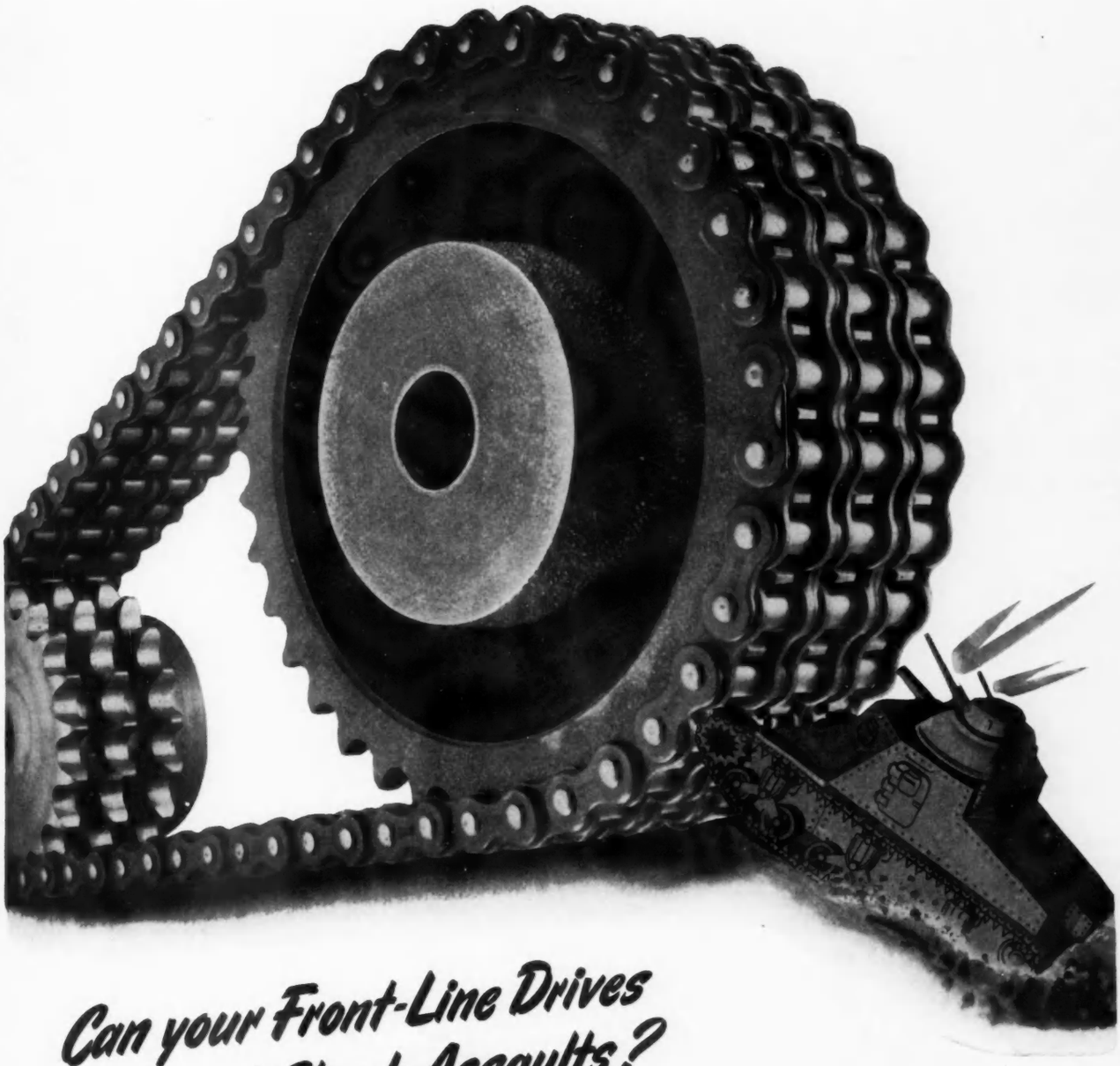
Another interesting cost figure is the average cost per day, excluding bits, for operating a heavy rotary in the Eastern States. The actual cost of the above mentioned five wells are probably high, and it is believed that in a regular development program the costs should be about $450 per day. The important costs in determining feasibility of rotary drilling in the Eastern States are those for drill pipe, tool joints and bits. Experience indicates at this time that a string of 4½-inch drill pipe will drill about 35,000 feet of hole.

From the data and analyses it appears that the rotary method of drilling is practicable for deep wells in the area. At depths of less than 6000 feet the additional cost per foot would make it impractical.

Individual Well Electric Jacks

By H. O. Murphy
Lloyd, Smith Company

Growing needs for economy in oil production in the Pennsylvania district has produced refinements in production equipment. Low power rates, together with a growing shortage of natural gas for engine fuel, are opening the way for increasing use of single well electric jacks. The complete elimination of surface rod lines, stroke posts and holdupholddowns does away with an approximate friction loss of 1.5 horsepower per 1000 feet of rod line and makes elec-



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trical equipment adaptable to any terrain. Most units are equipped with service brakes which will stop the well in any position on the up or down stroke so that necessary adjustments can easily be made by the operator.

The normal-torque, low-starting-current, splash-proof, ball bearing, 3-horizontal-induction motor seems to work just as well in the Bradford field as either the high-torque or the high-slip motor used in other fields. The normal-torque motor has a greater efficiency, higher power output and higher pullout torque than either the high-torque or the high-slip motor.

One type of counterbalance is that placed on the walking beam at the pitman end. This weight should balance the rod and half the column of fluid above the traveling valve when it is at the mid-point of the stroke. Under these conditions on the up-stroke the motor will lift a part of the counterbalance of equivalent weight. The work done in lifting the fluid will be the same regardless of the other work required in completing the cycle.

This can be accomplished by another type of counterbalance, which is placed upon the cranks. Here, when the crank passes through dead center, the motor, having light load, stores energy. During the peak load the motor will run at a slightly lower speed, allowing this stored energy to help carry the load.

The correct counterbalance apparently cannot be determined by any static method. A good method is to place an ammeter in the motor circuit. If the swing of the needle is the same for both halves of the polish rod cycle, the counterbalancing is good.

Heat Exchangers and Cooling Towers and Their Application to Compressor Plant Installations

By W. E. Dunn and Hugh R. Lamberth
The Fluor Corporation

The normal application of heat exchangers and cooling towers in a compressor plant covers engine and compressor jacket water, lubricating oil and gas cooling. Jacket water cooling has been subject to considerable difference of opinion as to what is good operating practice. Practices as to engine temperatures and quantity of water to be circulated are not widely divergent.

Two steps in setting up cooling requirements are: (1) determination of desired engine operating conditions, guided by engine manufacturers views and by experience, (2) selection of equipment to meet operating conditions adopted, local circumstances being considered.

Water-cooling systems are classified as: (1) open circulating systems, which include (a) cooling water available from rivers, wells, etc., and (b) recirculating systems utilizing open ponds, spray ponds, spray towers, atmospheric deck towers or mechanical draft towers; (2) closed circulating systems in which the substance to be cooled is passed through heat exchanger equipment and there cooled by water, air or other materials. Where water recirculation is not practiced, the water supply should be dependable in quantity, free from suspended matter, low in scale-forming materials and substantially neutral.

Where recirculation is necessary, the open system has the lower first cost and usually a slightly lower pump horsepower requirement. The spray pond probably would not suffice for many gas cooling problems.

The spray cooler or spray tower is an improvement over the spray pond but is limited in size to relatively small capacities. Spray cooler advantages are: simplicity, low first cost, higher efficiency than open pond or spray pond, and better performance under extremely low wind conditions. Disadvantages are: limited cooling efficiency, relatively low capacity per unit ground area and per pump horsepower, and water spray loss.

Atmospheric deck towers are generally accepted as the standard method of water cooling, having high flexibility, high capacity and economy. Mechanical draft towers are being used increasingly because despite their relatively high first costs they are compact, efficient and independent of natural air movement.

With respect to closed circulating systems, where circulating water used in the jackets is cooled in heat exchangers by an outside source of cool water or air, thus allowing the water to be kept clean, the exchangers are of three general types: (1) pipe coils, (2) open or atmospheric type cooling sections, (3) closed or shell and tube type. Pipe coils have been generally discarded. The open type cooling sections is probably the most widely used kind for gas cooling and jacket water cooling where the closed system is used, depending on good water distribution and air movement.

The closed or shell and tube type of exchanger finds less preferred application because of higher first cost and higher maintenance cost, although the heat transfer rates are good. It should be remembered in comparing open sections and shell and tube coolers that closed coolers are more difficult to service and need more facilities for maintenance.

In general, pumps, piping, valves and other accessories should permit pumping a continuous supply of water through the jackets with an average 15 degrees F. temperature range. If a cooling tower is used, winter distributing system located near the bottom of the tower will provide less water exposure in the tower and therefore less cooling. Even this might not be sufficiently effective in very cold weather. Recently there have been installed a number of air-cooled jacket water coolers and a few air-cooled gas coolers, which are particularly applicable where water is bad, insufficient or costly.

Gel-Type Cement

By John T. Reynolds
Halliburton Oil Well Cementing Company

The first use of gel-type cement in the Eastern district occurred in 1935 in Michigan in single string completions of cable tool wells. Cementing failures were common at first. It was felt that the cement slurry was not displacing the viscous bentonitic mud from all around the casing in wells, and the mud was mixed so that it had sufficient viscosity to hold cavings in suspension. To eliminate channeling, the cement was mixed with a thin solution of the same bentonitic mud that was used behind the casing to raise the slurry viscosity above that of the mud-laden fluid. Little trouble was encountered in the cementing after the viscosity of the cement slurry had been raised by the addition of bentonite.

It is considered that this type of completion is highly applicable in the present emergency. Many cable tool wells at present completed with several strings of casing left in the hole can be completed in a like manner, resulting in a saving of steel needed for completion.

Cementing casing in the Eastern district is important because of the new rotary drilling in Illinois. Results on several thousand cementing jobs make it possible to draw conclusions on the use of high water ratio, low compressive strength, gel-type cement. One company operating in the Illinois Basin determined how high water ratio, low compressive strength gel-type cement was used. On 119 cementing jobs using neat cement in 1937 and 1938 two main troubles were encountered: (1) cement returns at the surface were obtained on only 9 percent of the jobs run, (2) 15 percent of the wells had to be repaired to give a tight job around the shoe. It seemed that the solution of the troubles would be the reduction of the specific gravity of the slurry by raising the water-cement ratio. It was thought that a bentonite admix would allow this to be done because of various effects of bentonite in the cement mixture. This procedure resulted in a 57 percent reduction in repair jobs.

Natural Gas Flow in Pipe Lines

By E. N. Kemler and N. Kulik
School of Mechanical Engineering, Purdue University

The big problem encountered in making original designs or in modifying existing systems of natural gas pipe lines is selecting the friction factor used in determining the pressure drop. This papers discusses the information available on friction factor values for various types of applications, reviews the data available in the literature on friction factors, and outlines a simplified method of determining the pressure drop in gas lines.

The pressure drop for an incompressible fluid can be calculated from the familiar pressure drop equation. In the case of flow of compressible fluids the equation can be used satisfactorily where the pressure drop is a small percentage of the inlet pressure. If the pressure drop is large, the equation would be in error. However, it is possible to calculate the percentage error, and when this is known the exact value can then be simply calculated.

The method to be used in the solution of compressible flow problems will depend on the nature of problem. Methods have been outlined to aid in such solutions. The use of the correction factor, which permits the use of the incompressible flow equation for making compressible flow calculations, is quite helpful in reducing the arithmetic involved. A "velocity number" was presented for use when the application of the Reynolds Number in making pressure drop calculations cannot be directly made in instances where it is desired to determine the rate of flow to give a certain pressure drop. The method offers other possibilities in making general flow calculations.

Production and Runs Below Normal; Eastern Shortage Still Pronounced

Unfavorable trends that began developing early this year have continued, with transportation and market conditions growing increasingly adverse. This is the latest view of the industry's operations, afforded by statistics for the week ended April 4.

Crude-oil production and refinery runs of crude are both subnormal, in reflection of the lack of adequate transportation, while stocks of major products are unsatisfactorily distributed over the nation, with those of heavy fuel oil too low everywhere.

The East Coast shortage again was pronounced in the week of April 4, although rationing of gasoline permitted an increase of nearly a million barrels in Eastern stocks of that product, in the face of smaller refinery runs and further reduced gasoline production. Unrationed heating oil was taken from storage in the amount of practically a million barrels, and despite emergency shipments of residual fuel oil into the area, it was necessary to further draw on stocks of that produet to the extent of 98,000 barrels. These results were obtained while refinery runs of the Eastern plants showed a further decrease of 32,000 barrels to 429,000 daily, a rate that represented utilization of only 60 percent of crude-processing capacity. Before the submarine campaign was launched in American waters in mid-January, the Eastern refineries operated close to their rated capacity of 714,000 barrels daily.

The transportation shortage has resulted in shifting of available facilities from the Middle West and elsewhere to moving vitally needed fuel oils and other products into the East, and the tire situation meanwhile has reduced consumption, with the consequence that refineries in many other sections of the United States as well as on the East Coast have curtailed refinery throughput. In the week ended April 4, crude runs to stills for the nation as a whole were off by 152,000 barrels to 3,515,000 daily, a new low for this year and close to the lows of 1940 and 1941. At the new rate, the refineries of the country operated at only 75 percent of capacity and processed 102,000 barrels per day (3 percent) less than in the like week last year.

Coastal Texas plants were cut back 27,000 barrels to 866,000 daily, or 76 percent of potential, in the week of April 4, and Middle Western refineries were curtailed 37,000 barrels to 691,000 daily or 88 percent of capacity. California plants slowed 33,000 barrels to 558,000 daily or 71 percent of capacity. There were small reductions in runs also in the Appalachian, Inland Texas, and Coastal Louisiana districts. Small gains occurred in the Oklahoma-Kansas, North Louisiana-Arkansas, and Rocky Mountain districts.

Gasoline production was reduced in the week of April 4 in line with the curtailment of crude runs to stills, output of the nation having been about 70,000 barrels a day less than in the previous week. Reductions by districts included those of approximately 11,000 barrels daily on the East Coast, 1000 in the Appalachian area, 15,000 in the Middle West, 3000 in Inland Texas, 20,000 on the Texas Gulf Coast 3000 in Coastal Louisiana, and 23,000 in California. Output was larger in the several above mentioned districts where runs to stills were up.

In the face of the general curtailment of gasoline production, there was only a normal draft on gasoline storage, the national inventory having been lowered 475,000 barrels to 105,149,000. As indicated previously, there was a million barrels contra-seasonal accumulation of stocks on the East Coast, but it was compensated by a withdrawal of similar volume on the Texas Gulf Coast, while moderate reductions in stocks occurred in these districts: Appalachian, Middle West, Oklahoma - Kansas, and North Louisiana-Arkansas. Stocks were somewhat increased in the Inland Texas, Coastal Louisiana, Rocky Mountain, and California districts. The nation's gasoline stocks now are 6,583,000 barrels (6.7 percent) larger than a year ago.

United States stocks of gas oil and distillate fuel were reduced 525,000 barrels in the week of April 4 to 31,231,000, a quantity 1,693,000 barrels (6 percent) greater than that on hand a year earlier. The Texas-Louisiana Gulf Coast was the only region that added to storage, but withdrawals were all small except that of a million barrels on the East Coast.

Residual fuel oil stocks of the country were lowered again over a half million barrels, leaving on hand only 82,455,000 barrels, of which 59,783,000 was in California. The decrease of the week was accounted for largely by the Gulf Coast. Aside from the small withdrawal on the East Coast, there were nominal decreases also in the Inland Texas and North Louisiana - Arkansas districts. Small additions to stocks occurred in the Appalachian, Middle Western, Oklahoma-Kansas, Rocky Mountain, and California districts. The nation's stocks of the heavy fuel oils now are 11,000,000 barrels (12 percent) smaller than a year ago.

Crude Oil Production in the United States

(Estimates compiled by The Oil Weekly. All figures indicate daily averages, in barrels)

STATE OR DISTRICT	[1]OPC Allocation in April	PRODUCTION IN WEEK ENDED	
		April 4	April 11
Arkansas	74,000	76,700	75,600
California	659,800	560,100	622,300
Long Beach		31,700	37,500
Midway-Sunset		50,300	61,400
Kettleman Hills		21,500	23,600
Wilmington		91,700	91,900
Rest of State		364,900	407,900
Colorado	6,900	5,650	5,150
Illinois	354,400	316,000	298,900
Salem		47,300	47,200
Louden		53,000	51,600
Other New Pools		203,900	188,150
Old Pools		11,800	11,950
Indiana	18,200	19,400	18,250
Kansas	253,400	246,700	236,100
Kentucky	12,800	12,700	12,400
Louisiana	313,000	317,750	336,350
North		80,950	80,650
South		236,800	255,700
Michigan	60,200	45,950	51,300
Mississippi	49,800	98,000	98,350
Missouri		130	130
Montana	23,700	21,400	21,600
Nebraska	5,000	4,100	4,150
New Mexico	86,000	82,700	80,000
New York	14,600	13,150	13,850
Ohio	10,100	9,950	9,750
Oklahoma	436,900	389,900	393,400
Oklahoma City		79,050	72,350
Seminole Area		100,650	104,200
Rest of State		210,200	216,850
Pennsylvania	49,900	50,650	56,300
Tennessee		30	30
Texas	[2]1,134,000	1,042,200	1,089,300
Upper Gulf Coast		218,200	234,800
East Texas Field		225,800	226,200
Rest of Eastern Texas		78,900	78,900
Lower Gulf Coast		74,000	79,400
Southwest Texas		42,700	46,800
South Central Texas		18,700	18,700
West Texas		178,600	186,700
North Texas		146,800	115,500
Panhandle		58,500	102,300
Utah		15	15
West Virginia	15,200	10,250	9,900
Wyoming	88,900	88,420	88,710
Total United States	3,666,800	3,411,845	3,521,835

[1] Production rates recommended for states by Office of Petroleum Coordinator, on Basis of Bureau of Mines forecast of the nation's daily average requirement for domestic crude during month. State conservation authorities have prescribed allowables calculated to hold actual production within OPC allocations. (Details on state allowables published March 30, 1942, page 47.)

[2] Most Texas fields were ordered shutdown 18 days: April 3, 4, 5, 6, 10, 11, 12, 13, 17, 18, 19, 20, 24, 25, 26, 27, 29, and 30.

Production Gains Slightly; Below Recommended Figure

United States production of crude oil and related fuels averaged 3,521,835 barrels daily in the week ended April 4. It was 109,990 barrels higher than in the previous week but 144,965 less than the daily average output recommended for April by the petroleum coordinator.

The increase of the week reflected large gains in California and Texas and smaller advances in Louisiana, Michigan, and Oklahoma. Decreases were recorded in Arkansas, Illinois, Kansas and New Mexico. Mississippi was virtually unchanged.

California rose to 622,300 barrels daily from 560,100 the week before, and Texas to 1,089,300 from 1,042.200, while Louisiana went to 336,350 from 317,750, Michigan to 51,300 from 45,950, Oklahoma to 393,400 from 389,900, and Mississippi to 98,350 from 98,000. Arkansas declined to 75,600 a day from 76,700, Illinois to 298,900 from 316,000, Kansas to 236,100 from 246,700, and New Mexico to 80,000 from 82,700.

Texas Cycling Plants Reduce Production

Texas cycling - plant operators have begun voluntary reduction of operations as a result of a decision by the petroleum coordinator to include condensate

and natural gasoline in the demand for oils from various states. Agua Dulce Company, operating in the Agua Dulce field, Nueces County, announced it would cut its run a third.

South American Group Plans Publication

With national chapters created in Bolivia, Chile, Argentina, Peru and Uruguay, the Instituto Sud Americano de Petroleo, organized by Argentine and Uruguay engineers, is scheduled to meet soon in Montevideo to discuss organization of an official publication of the institute. National chapters are expected to be formed shortly in Colombia, Ecuador and Venezuela.

Two New Tests Get Underway in Colombia

Two new tests are under way in Colombia. Richmond Petroleum Company's Braval 2 was spudded last week on the Camacho concession, Department of Bolivar, where No. 1 was abandoned at 2800 feet several weeks ago. Shell Oil Company of Colombia is drilling below 400 feet in El Doce 1, a Magdalena Department test. Shell is below 2400 feet in Casabe 3 following completion of No. 2 for several hundred barrels per day.

Japanese Taking Over Burmese Fields

Another Far Eastern oil region was within the grasp of the Japanese last week as the invaders drove the British from Prome, Burmese village lying at the southern tip of a string of small fields extending northward to Mandalay. The fields lie along the Irrawaddy river and produce about 8,000,000 barrels per year of high-gravity oil mostly refined at Rangoon, where the oil is carried by pipe line. Principal producing regions are Yenangyaung and Singu, which have been yielding about 10,000 barrels per day each, or 90 percent of the total Burma production.

Mexican Production in February 141,892 Daily

Crude oil production in Mexico during February totaled 3,972,981 barrels (141,892 daily) of which 3,194,886 barrels came from expropriated properties and 778,095 barrels from government-owned lands.

Gasoline consumption in that country during January amounted to 416,050 barrels, an average of 13,421 barrels daily, of which all was manufactured by Petroleos Mexicanos, the government company, except 1400 barrels (45 daily), which was imported.

Expropriated properties continue to account for the bulk of the country's crude oil production, with Poza Rica far above any other field in output.

The February production came from expropriated and government-owned properties and from the different fields as follows (barrels):

Field	Expropriated	Government	Total
Panuco Heavy	521,351	15,418	536,769
Southern Fields Outside Poza Rica	294,082	6,903	300,985
Poza Rica	1,962,598	740,619	2,703,217
Isthmus:			
El Plan	213,519	15,155	228,674
Gabilon	67,540	.....	67,540
Tonala	63,465	.....	63,465
Felisola	30,447	.....	30,447
Acalapa	25,977	.....	25,977
Isthmus Heavy	15,907	.....	15,907
Total Mexico	3,194,886	778,095	3,972,981

Colombian Candidate Favors Oil Nationalization

Colombia's oil industry may become an issue in the presidential race which terminates in the elections on May 3. Dr. Carlos Arango Velez, candidate of the liberal-conservative coalition in Colombia, is reported to have declared in a recent radio address that he favors the nationalization of all private oil property. He has sought a statement on the matter from his opponent, Ex-President Alfonso Lopez, leader of the liberal party.

Flour Bluff Ratios Cause of Concern

Cooperation by the Office of Petroleum Coordinator in working out an improvement of gas-oil ratios in the Flour Bluff field was offered at a hearing before the Texas Railroad Commission last week. W. J. Murray, Jr., OPC conservation engineer, offered the assistance.

Enforcement of the gas-oil ratio limit in the field has cut the allowable of several wells to three or four barrels daily. As a result, operation of these wells has become unprofitable and some of the companies have asked for relief. Commission representatives at the hearing indicated that they favored reduction of the ratios rather than an increase which would permit profitable operations.

New Butadiene Plant Reported Planned

Announcement was made last week that construction will begin in May on a $75,000,000 butadiene plant at Port Neches, Jefferson County, Texas. Five Companies—Gulf Oil Corporation, The Texas Company, The Atlantic Refining Company, The Pure Oil Company, and Magnolia Petroleum Company—have formed Neches Butadiene Products Company to build the plant.

The unit, it is reported, will have an annual capacity of between 50,000 and 100,000 tons. The new company is said already to have closed trades for land upon which the plant will be built.

Texas Permits

The Texas Railroad Commission last week approved permits for drilling 21 wells in Texas, the same number that was granted the week before.

Nine permits were allowed in East Central Texas, two in West Texas, nine in Southwest Texas, and one in North Texas. No locations were sought in the East Texas field, West Central Texas, the Gulf Coast or in the Panhandle.

Government Recruiting for Technologists Continue

About a year ago the Federal Civil Service Commission began a recruiting drive for technologists. The number of persons on the employment lists now established is not sufficient for today's war-time needs. Accordingly, the commission has recently reissued the announcement of these opportunities for government employment with slightly modified requirements. Salaries for the positions range from $2,000 to $5,600 a year. Applications may be filed until further notice with the commission's Washington office.

By technologist the commission means a person experienced in "the necessary production, engineering, and scientific research work essential for the successful operation of an industrial plant, where such plant operation is based upon a thorough and expert knowledge of a branch of an applied science," such as explosives, fuels, plastics, rubber, minerals, or textiles.

For the junior positions ($2,000 a year), applicants will no longer have to take a written test, and, as before, no written test will be given for the higher positions.

Trends of Operations and Changes in Stocks

Figures on crude stocks are from Bureau of Mines weekly reports; all others from American Petroleum Institute weekly reports, which are estimates on Bureau of Mines basis.

ITEM	Crude Oil Prod.		Runs to Stills		Crude Stocks		Gasoline Stocks		FUEL OIL STOCKS			
									Gas Oil & Dist.		Resid. Fuel Oil	
	Bbls. Day (Add 000)	Week Ended	Bbls. Day (Add 000)	Week Ended	Bbls. (Add 000)	Week Ended	Bbls. (Add 000)	Week Ended	Bbls. (Add 000)	Week Ended	Bbls. (Add 000)	Week Ended
Highs:												
1939	3,910	8- 5	3,650	10-21	278,607	5-26	87,769	4-22	39,562	10-28	116,237	8-26
1940	3,890	3-16	3,690	6-22	265,865	8-31	102,817	4-20	49,051	10-19	109,135	9-14
1941	4,337	11-22	[1]4,120	10-18	266,187	3-29	99,727	3-29	[1]54,983	11-15	102,448	1- 4
1942	[1]4,337	2- 7	3,961	1- 3	263,208	3-28	[1]107,229	3-14	49,357	1- 3	95,857	1- 3
Lows:												
1939	[3]1,601	8-26	3,125	2-18	[2]229,127	10-21	71,152	10- 7	20,722	4-15	105,397	4- 8
1940	3,335	11-30	3,370	1- 6	237,339	1-27	79,847	11- 9	23,551	4- 6	102,344	2-10
1941	3,364	1-11	3,490	1-18	240,399	11-15	80,870	10- 4	28,381	4-12	92,635	7- 5
1942	3,418	4- 4	3,515	4- 4	244,364	1-10	92,987	1- 3	31,231	4- 4	82,455	4- 4
Trends in 1942 (Week Ended):												
Jan 3	4,038	.....	3,961	.....	244,440	.....	92,987	.....	49,357	.....	95,857	.....
Jan 31	3,871	.....	3,848	.....	250,740	.....	97,810	.....	40,674	.....	91,189	.....
Feb. 28	4,016	.....	3,675	.....	259,373	.....	105,635	.....	34,547	.....	88,285	.....
Mar. 28	3,820	.....	3,667	.....	263,208	.....	105,624	.....	31,756	.....	83,045	.....
April 4, 1942	**3,418**	.....	**3,515**	.....	.....	.....	**105,149**	.....	**31,231**	.....	**82,455**	.....
April 4, 1941	3,514	.....	3,617	.....	[4]266,187	.....	98,566	.....	29,538	.....	93,803	.....
Change:												
In week	—402	.....	—152	.....	+1,484	.....	—475	.....	—525	.....	—590	.....
In year	—96	.....	—102	.....	—2,979	.....	+6,583	.....	+1,693	.....	—11,348	.....
In year	—2.7%	.....	—2.8%	.....	—1.1%	.....	+6.7%	.....	+5.7%	.....	—12.0%	.....

[1] All time peak. [2] Lowest since April, 1922. [3] Lowest since October, 1922, due to shutdown of six Mid-Continent states. [4] Stocks, March 29, 1941.

U. S. Field Operations

Illinois

Jefferson County Wildcat Swabs 200 Barrels

Jefferson County wildcat swabs 200 bbls initially; Marion County wildcat testing, showing for producer; casing set to new prospective pay zone in Bible Grove pool, Clay County; show of Aux Vases oil found in Williamson County wildcat; Edward County wildcat cased.

Jefferson County: Deaton-Bears' Howard 1, NE NE NW 5-1s-3e, four miles east of Dix field, swabbed 200 bbls from McClosky at 2621-26 ft; is to be re-acidized.

Seaboard Oil Co.'s Yeager 1, NW SE NE 28-3s-4e, wildcat near Belle, making drill-stem in McClosky 3110-15 ft after failure to recover core from that section; upper formations dry.

Marion County: Louis Lilly's Leonard 1, NE SE NE 17-1n-1e, mile east of Centralia, swabbing 3 bbls of oil an hour natural from Stein (Cypress) at 1666-72 ft; scheduled for shot. Leonard 1 is 1200 ft southwest 20-year-old Brown 1, a Stein producer still making 5 bbls daily. There is no other production in area.

Seaboard's Miller 1, SW SW NW 8-3n-4e, near Omega, abandoned 2541 ft; ele. 570, Glen Dean 1963, Barlow 2139, St. Genevieve 2409, St. Louis 2531 ft.

Clay County: Texas Co.'s Landwehr 1, NW SW NE 8-5n-7e, south offset to Cameron Oil Co.'s Landwehr 1, McClosky pool opener north of Bible Grove, WOC with pipe on Cypress saturation at 2490 ft after plugback from dry McClosky.

Williamson County: Shell's Madison 1, SE NW 10-8s-3e, northeast of Johnston City, drilling below 2848 ft in St. Genevieve, topped 2848 ft; on hour's drill-steam test of Aux Vases lime (correct) at 2826-38 ft only 17 ft of mud were recovered. There have been no commercial shows.

Edwards County: Steele et al Couch 1, 330 feet south line, 1160 ft east line, fractional 6-1s-11e, wildcat near Bone Gap, WOC with casing on McClosky saturation. On hour's drill-stem test 120 ft of oil-cut mud and no water were recovered. From elevation of 512 ft St. Genevieve was topped at 3126 ft.

Wayne County: First National Petroleum Trust's Ellis Community 1, C NW SE 18-1s-5e, second test in new Orchardville field, WOC with pipe on Aux Vases saturation 2960-72 ft; Bell Brothers' Wilson 1, C SW NW 18-1s-5e, third test in area, drilling below 2900 ft.

Carter's Wright 1, C NW SW 23-2s-6e, five miles east, mile south Wayne City, abnd 3399 ft.

A. W. Gerson's Leppo, W½ NW SW 24-2n-5e. 3½ miles southwest Xenia, abnd 3028 ft, through McClosky.

Eason Oil Co.'s Powless 1, C NE SW 4-1s-6e, south of Johnsonville field, abnd 3279 ft, light show in Aux Vases 3050-63 ft.

COMPLETIONS

Bond County: Wildcat—Downing & George's Sorento Bank 1, c n½ sw ne 31-7n-4w, abnd 2025 ft.

Clay County: Wildcats—Cameron Bros.' Landwehr 1, nw nw ne 8-5n-7e, McCl 2810-25 ft, td 2825 ft, 695 bbls.

Sinclair's Stanley 1, c w½ nw ne 8-4n-8e, abnd 3150 ft.

Clinton County: Wildcat—Holman & Denson's Kolmer 1, ne sw se se 22-1n-5w, abnd 1300 ft.

Edwards County—Central P. L. Co., et al's Blackford 1, c n½ sw se 31-2n-14w, McCl 3141-46 ft, td 3190 ft, pb 3163 ft, 956 bbls.

Effingham County—Jones & Martin's Leith 3, 100 ft n of ne sw nw 27-6n-5e, abnd 2337 ft.

Franklin County—A. W. Torbett's Isaacs 1-A, apx c w l sw sw ne 1-6s-2e, Pt. Creek sand 2603-23 ft, td 2626 ft, 30 bbls.

Franklin County: Wildcat—Seaboard's U. S. Coal & Coke 1, sw se 14-6s-4e, Weiler 2839-55 ft, td 2860 ft, 113 bbls.

Perry County: Wildcats—Blankenship et al's

Results on Industry's Prospecting Fronts

Completion of 37 wildcat wells in the United States, including 7 oil producers, brings total reported this year to 762, of which 92 produced oil. (See tabulation below.)

Illinois: One wildcat producing, several have flattering prospects.

Indiana: Posey County wildcat showing.

Kansas: New gas field in Barber County.

California: Ratio of wildcat failures high.

Rocky Mountain: Wildcats started in three states.

East Texas: Making test of Woodbine showing in Anderson County wildcat.

Texas Gulf Coast: Deepest producer adds area to new Montgomery County field. Second well in San Jacinto County. Harris County wildcat makes distillate.

North Texas: Ellenburger strike in Jack County.

Southwest Texas: Two new fields, one new sand, several favorable prospects.

West Texas: Abell extended. Andrews deep pool confirmation showing favorably.

Nebraska: Too much water in Viola discovery.

Oklahoma: New pool opened in Bryan County; extension and new sand recorded.

Summary of Drilling Operations in the United States, Week Ended April 11, 1942

	WELLS COMPLETED							WILDCAT COMPLETIONS‡					
	Completions	Oil Wells	Gas Wells	Failures	†Miscellaneous	Total 1942	Total this Date 1941	Total this Week	Oil Wells	Gas Wells	Failures	Distillate Wells	Total 1942
Alabama	1	....	....	1	....	3	....	1	....	....	1	....	3
Arkansas	1	....	....	1	....	38	46	1	....	....	1	....	4
California	11	4	....	6	1	245	304	....	....	....	....	....	6
Colorado	....	....	....	....	....	4	5	....	....	....	....	....	....
Georgia	....	....	....	....	....	1	....	....	....	....	....	....	1
Illinois	17	9	....	8	....	559	874	9	4	....	5	....	121
Indiana	5	2	....	3	....	111	122	2	1	....	1	....	7
Kansas	26	12	....	11	3	460	538	6	....	....	6	....	104
Kentucky	1	....	....	....	1	46	61	....	....	....	....	....	3
Louisiana	14	10	....	3	1	317	374	1	....	....	1	....	50
Michigan	9	6	....	3	....	196	220	2	....	....	2	....	46
Mississippi	2	1	....	1	....	48	45	....	....	....	....	....	11
Missouri	....	....	....	....	....	9	16	....	....	....	....	....	....
Montana	3	2	....	1	....	43	58	....	....	....	....	....	....
Nebraska	1	1	....	....	....	15	22	....	....	....	....	....	5
New Mexico	3	1	....	2	....	121	101	....	....	....	....	....	8
New York	....	....	....	....	....	346	180	....	....	....	....	....	....
Ohio	12	2	6	4	....	354	417	....	....	....	....	....	....
Oklahoma	19	5	....	10	4	489	539	2	1	....	1	....	77
Pennsylvania	48	46	1	1	....	988	956	....	....	....	....	....	....
Tennessee	....	....	....	....	....	2	5	....	....	....	....	....	....
Texas	99	61	1	32	5	2,122	2,533	13	1	....	12	....	315
West Virginia	10	1	9	....	....	211	192	....	....	....	....	....	....
Wyoming	5	3	....	2	....	29	30	....	....	....	....	....	1
Total this week	287	166	17	89	15	6,757	7,638	37	7	....	30	....	762
Total last week	366	198	22	118	28	6,470	7,020	63	6	....	57	....	725
Total last year	6,757	3,925	542	1,617	673	....	....	762	92	9	659	2	....

† Includes old wells deepened, water intake, gas input, salt water disposal, and distillate wells.
‡ OPC program calls for 4,000 wildcats in 1942, of which 624 should produce oil and 116 gas, leaving 3,260 dry.

Wyliskalia 1, c sw sw se 11-4s-1w, abnd 1702 ft.

J. Harsh et al's Newborn 1, se se nw 22-4s-1w, Weiler 1128-35 ft, td 1515 ft, pb 1150 ft, 16 bbls.

Tazewell County: Wildcat — Bartlemay's Mathis 1, nw sw nw sw 24-25n-3w, abnd 1675 ft.

Wabash County—Brookhaven Oil Co.'s Shaffer 1, se sw sw 9-1n-12w, abnd 2152 ft.

Wayne County—Texas Co.'s Harlin 1, c w½ ne ne 28-1s-6e, A. V. 3058-82 ft, McCl 3188-95 ft, td 3215 ft, 263 bbls.

Gulf's Blackburn 1, 83 ft w of c s½ sw sw 1-2s-7e, McCl 3322-29 ft, td 3329 ft, 707 bbls.

White County—McBride Inc.'s Gray 2, nw sw se 30-3s-8e, A. V. 3201-24 ft, td 3224 ft, 74 bbls.

Rockhill Oil Co.'s Gray M-6, se sw nw 30-3s-8e, abnd 3426 ft.

White County: Wildcat—Seaboard's Gates 1, sw nw sw 3-5s-9e, A. V. 3228-40 ft, td 3240 ft, 67 bbls.

WILDCAT STARTS

Alexander County—Whitehead & Kippings' Manton 1, se nw se sw 4-15s-3w, dr.

Bond County—W. Braun's Story 1, sw sw sw 34-6n-2w, lcn.

Clay County—Chris Pearson's Murvin 1, sw nw 15-5n-7e, lcn.

Fayette County—Brewton Test's McNally 1, se sw sw sw 19-5n-4e, dr.

Hamilton County—Pure's Johnson 1, nw ne 3-7s-6e, lcn.

Jefferson County—Rewaldt & Bayer's Mace 1, nw ne se 33-3s-3e, lcn.

Seaboard's Yeager 1, nw se ne 28-3s-4e, lcn.

Lawrence County—Geo. H. Gimple's Goodwin 1, c w½ se nw 28-5n-10w, lcn.

Wayne County—N. V. Duncan et al's Wylie 1, c ne ne 14-1s-6e, lcn.

Texas' Harlan 2, c w½ se se 21-1s-6e, lcn.

KENTUCKY

OLD WELL DEEPENED

McLean County—B&B Oil Co.'s Rock 1, 4-L-29, McCl 1619-20 ft, otd 1360 ft, td 1620 ft, 10 bbls.

WILDCAT START

Webster County—Sun's Gibson 1, 19-N-22, dr.

Indiana

Posey County Wildcat Shows in Aux Vases

Paul Rossi's Mauzy 1, NE NW NW 8-7s-12w, Posey County, wildcat east of Mt. Vernon and two miles from nearest production, was showing for new Aux Vases sand pool-opener, being swabbed with 500 ft of oil in the hole two hours after plug was drilled, to saturated break at 2609-17 ft.

Carter's Allyn 1, C NW NE 28-6s-14w, wildcat five miles northwest of Mt. Vernon, set casing to Tar Springs sand saturation, 2137-45 ft, after unsuccessful attempt to get a drill-stem test. Hole was bottomed through a dry McClosky at 3010 ft, then plugged back.

Carter's Kiltz 1, C NE NW 8-6s-13w, wildcat five miles north of Mt. Vernon, was abandoned, dry to 3051 ft through McClosky.

Gibson County: Kingwood Oil Co.'s Potts-Phillips 1, C N½ Donation 111, 1 N, 10 W, was shut down for orders at 2449 ft, after non-commercial test of Osage lime saturation, but may test McClosky at 1691-1751 ft before abandonment.

Kingwood's Fithan 1, E½ SE SE 3-1n-10w, in the Hazleton area, first Osage producer in Indiana, shows for about 150-bbl well after 500 gallons acid at 2402-09 ft.

Vanderburgh County: Southwest of Evansville two wildcats were abandoned. Amerlagene, Inc., Eichele Unit 1, C NE NW 29-6s-11w, was bottomed at 2678 ft in the St. Louis lime. Glenwood Oil Co.'s Camp 1, NW SW 15-7s-11w, carried water in the Waltersburg sand and was bottomed at 1652 ft.

COMPLETIONS

Gibson County—Walter Miller et al's Hall 1, c e½ ne sw 20-1s-11w, abnd 2276 ft.

Pike County: Wildcat—Paul P. Steed et al's McClure 1, c sw ne 3-3s-7w, abnd 1320 ft.

Posey County—S. D. Jarvis' Gumbel 2, nw sw se 36-6s-12w, Walts 1796-1803 ft, td 1803 ft, 40 bbls.

Lloyd Sloan et al's Scherer 3, se sw nw se 13-7s-13w, abnd 2752 ft.

Posey County: Wildcat—Carter's Baker 1, c sw nw 9-7s-14w, McCl 2838-42 ft, and 2845-49 ft, td 2963 ft, pb 2875 ft, 262 bbls.

WILDCAT STARTS

Vanderburg County — Amerlagene, Inc.'s Eichle 1, c ne nw 29-6s-11w, dr.

Glenwood Oil Co.'s Kamp 1, c nw sw 15-7s-11w, lcn.

Nebraska

Dawson Viola Strike Has Too Much Water

Water troubles plague state's first Viola lime producer, testing delayed; second Viola test ready to drill in; new wildcat start in Nemaha County.

Dawson: Power Oil Co.'s Bohrer 1, C E½ SW NW 10-1n-14e, first Viola lime producer for Nebraska and Falls City Basin, has produced some oil but operators are attempting recement job to halt influx of large amount of water from upper horizon, no estimate available on potentialities of new strike; Skelly Oil Co.'s Wiltse 1, C E½ NW SE 10-1n-14e, erecting tanks for testing Viola lime topped at 2176 ft, saturation was encountered to 2885 ft.

Nemaha County: Gulf Oil Corp. has staked location for a new wildcat test, in C SW SW 26-6n-15e, 1½ mi southeast of Mount Vernon. Operations due to start immediately.

Barada: Ike Taylor et al's Zentner 1, C W½ SW SE 36-3n-16e, Richardson County, topped Hunton lime 2388 ft, cored spotted saturation to 2400 ft, shutdown awaiting casing for a test.

COMPLETION

Richardson County: Barada—Skelly's Merz 2, c e½ se ne 35-3n-16e, Hunton 2413-88 ft, td 2488 ft, perf, set packer 2383 ft, 5000 gals acid, 220 bbls.

WILDCAT START

Redwillow County—Sinclair Prairie's Land Bank 1, sw sw se 11-2n-28w, lcn.

Florida

Continue Detail Survey Of Florida Keys Bay Area

Gravity and magnetic work has been completed on the Florida Keys and the Bay of Florida, and more detailed geophysical studies are planned on six prospects in the Bay region, according to Wm. G. Blanchard, who has a 7-million-acre lease on state lands that includes all the Keys and Bay area as well as a part of the southern tip of the state.

During the recent construction of a highway to Key West, oil and gas made its appearance in several 22-foot excavations.

Blanchard and associates' second test in the Everglades, Dade County, is down to 3086 feet in Wilcox (Eocene) limestone and coring solidly.

NEW MEXICO

COMPLETIONS

Eddy County—Dixon-Yates et al's Day 1, c ne se 12-18s-29e, flow 960 bbl 2-in, shot 110 qts 2747-84 ft.

Ottis A. Roberts et al's State-Carpenter 2, nw ne ne 25-17s-27e, abnd 485 ft.

Geo. Williams et al's Brooks 1-A, ne se ne 27-17s-27e, abnd 620 ft.

Oklahoma

Cumberland Extension Makes Heavy Flow

Logan County wildcat may open new Layton sand production; Payne County test running high; Cumberland extension well makes heavy flow; Apache deep test encounters slight saturation; new producing zone apparent in Hughes County pool.

Bryan County: Pure Oil Co.'s Teeter 1, SE SW NW 31-4n-1e, has opened a new Wilcox sand pool in Southern Oklahoma. On drill-stem test the wildcat produced at rates varying from 10 to 75 bbls per hour from 3910 ft, after topping the sand at 3885 ft. Has shut in to run pipe. Formation pressure showed high through some mud.

Logan County: Fain and Porter et al's Ferguson 1, SW SW SE 27-17n-4w, ½ mi east of old Crescent field, topped Layton sand at 4924 ft, cored to 4949 ft for favorable showing and was ready to test after drilling plug, may open new field.

Payne County: Coralena Oil Co.'s Tignor 1, NE NE NW 19-20n-4e, south of Glencoe, topped Layton sand at 2950 ft, checking 85 ft high to nearby dry hole, expecting Bartlesville sand 3800 ft.

Bryan County: Pure's 1, 109, SEc NW 20-5s-7e, ¾ mi northwestern extension of Cumberland field, made 104 bbls oil per hr for daily potential of 2496 bbls, after drilling to 5911 ft in McLish zone.

Caddo County: Texas Co.'s Mulkahay 6, NE SE SE 2-5n-12w, on east side of Apache pool, deepest test in the area, cored to 4988 ft in the Simpson zone for slight asphaltic and black oil stainings.

Hughes County: Carolyn Oil Co.'s Hall-Williams 1, SWc NE 14-9n-10e, may open Wilcox sand production in East Wetumka (Hunton lime) pool, topped Wilcox sand 3928 ft, cored to 3937 ft for showing of saturation and free oil in the hole, casing set for test, earlier indicated a producer in both Gilcrease sand and Hunton lime.

COMPLETIONS

Caddo County: Apache—Texas Co.'s Smith 1, ne ne ne 3-5n-12w, Bromide prod, 5000 bbls, 3771 ft.

Kay County: Dilworth—McKnabb's Currie 1, nw ne se sw 19-28n-1e, abnd 3479 ft.

Kiowa County: Hobart — Mathews & Thorpe's Wooten 3, ne se se 28-7n-17w, abnd 60 ft.

Jefferson County: Wildcat—Carter's Robinson 1, c sw sw 19-4s-6w, chert 4670 ft, Simp 4785 ft, Arb 5788 ft, abnd 5902 ft.

Okfuskee County: Fields — Olsen Drlg.'s Harden 1, sw nw se 35-13n-9e, 2nd Wilcox 4015 ft, abnd 4027 ft.

Okfuskee County: Haydenville—Martin et al's Lauder 1A, 85 ft n of c s l se sw se 21-13n-10e, sand 608 ft, abnd 675 ft.

Oklahoma County: Oklahoma City—Clark & Co.'s Smith 1, nw c se sw 15-11n-3w, Simpson 6679 ft, abnd 6685 ft.

Okmulgee County: N. Beggs—S. I. B. Handler s Adams 17, nw c se nw 10-15n-11e, Bartlesville 1942 ft, shot 100 qts, pump 10 bbls, td 1983 ft.

Pottawatomie County: East St. Louis—Eagle's School Land C-7, sw nw ne 16-7n-5e, Wilcox 4106-14 ft, shot 20 qts, 100 bbls, td 4114 ft.

Pottawatomie County: New Pool — Cities Service & Atlantic's Ft. Cobb 1, sw ne ne 4-8n-3e, Hunton 4768 ft, pb 5102 ft, perf 970 bbls, td 5465 ft.

Pottawatomie County: N. St. Louis—Viersen et al's Acton 1, ne ne ne 28-8n-4e, Hunton 3879 ft, td 3896 ft, 2000 gals acid, flow 262 bbls.

Seminole County: Bowlegs—McKinney & Reynolds' Carter 1B, se nw ne se 23-9n-6e,

base of Calvin 2437 ft, td 2470 ft, pb 2422 ft, abnd.

Seminole County: Sylvan—Stanolind-Amerada's Grisso 1, nw sw ne 11-10-7e, Wilcox 4422 ft, td 4444 ft, pb 3575 ft, perf casing, abnd.

Stephens County: Loco—Elko O&G's Dilley 1, se ne ne 7-3s-5w, sand 481-91 ft, abnd 500 ft.

Stephens County: West Loco — Elm Oil's Massey 1, sw nw nw 8-3s-5w, Sand 494-94½ ft, abnd 504 ft.

OLD WELLS DEEPENED

Caddo County: Cement—Ray Stephens' Farwell 1, ne ne sw 27-6n-10w, otd 5728 ft, sand 5548-5728 ft, td 6204 ft, perf 5,000,000 gas.

Kiowa County: Hobart—Phillips' Warner 2, nw ne se 19-7n-17w, otd 1130 ft, lime 1135-40 ft, 1150-56 ft, td 1186 ft, pump 5 bbls.

Okfuskee County: Fields — Brown Straus' Wagner 7A, se ne ne 11-11n-11e, otd 862 ft, sand 1217-47 ft, abnd 1300 ft.

Stephens County: W. Loco—C. Scott's Wilson 7, 120 ft n of c n½ ne sw 9-3s-5w, otd 1006 ft, abnd 1669 ft.

WILDCAT STARTS

Carter County—Pure's Fraser 1, c sw ne se 26-3s-1e, lcn.

Creek County—Kennedy's Eason 1, sw nw se 12-14n-10w, lcn.

Lastecas Petroleum's Jackson 1, c sw se 9-18n-9e, spud.

Jefferson County—Gulf's Greiser 1, c ne ne 28-7s-7w, cellar.

Seminole County—Shell's Smith 1, nw ne ne 4-9n-7e, rur.

Stanolind's Johnson 1, nw nw se 28-9n-8e, lcn.

Kansas

Lake City New Gas Field, Barber County

Lake City pool opener completed as a gas producer after oil failure; operators debate testing of Bartlesville sand showing in Cowley County; second test in new Reno County pool has only slight showing.

Barber County: Pryor & Lockhart's Gant 1-A, C SE 7-31s-13w, discovery well of Lake City pool, has been rated at 2,500,000 cu ft gas daily, well earlier indicated new oil production in Viola lime at 4438 ft where gas blowout occurred, operators then carried test to Simpson series at 4656 ft for water only.

Cowley County: Nelson Drilling Co.'s Crowley 1, SW NW NE 31-30s-6e, east of Eastman pool, cored 2892-2919 ft in Bartlesville sand, logging saturation in last 15 ft, operators drilled to 2921 ft, now debating setting casing for test.

Reno County: Nate Appleman et al's Schweizer 2, SE SW NW 31-22s-9w, offset to discovery well of Schweizer pool, topped Viola lime 3698 ft, drilled to 3718 ft for only slight show of light oil stainings, casing set for test on bottom.

COMPLETIONS

Barton County: Unnamed—J. J. Lynn's Smith 1, c s½ ne sw 36-16s-11w, Arb 3350-52 ft, td 3373 ft, 6000 gals acid, pump 367 bbls.

Barton County: Feltes — Black - Marshall's Weber 4, c n½ se se 14-16s-12w, Arb 3375-81 ft, td 3381 ft, pump 105 bbls.

Barton County: West Ainsworth—Continental's Schreiver 1, se se se 32-16s-13w, Lansing 3128 ft, td 3377 ft, pb 3340 ft, abnd.

Barton County: Kraft—Skelly's Armbrust 1, ne ne nw 21-17s-11w, td 3340 ft, Arb 3332 ft, perf casing, 1000 gals acid, abnd.

Barton County: Wildcat—Derby et al's Axman 1, c s½ se sw 29-17s-15w, Anhy 1029 ft, Ft. Filey 2055 ft, Florence 2165 ft, Wreford 2230 ft, Topeka 3003 ft, Lansing 3306 ft, Congl 3550 ft, Arb 3570-80 ft, 1000 gals acid, abnd 3597 ft.

Butler County: El Dorado—Cities Service's Wilson 213, nw se nw 8-25s-5e, Kansas City 1970 ft, td 2041 ft, 2000 gals acid, pump 22 bbls oil and 26 bbls water.

Cowley County: Wildcat—Aylward Prod's Knight 1, sw nw nw 29-32s-5e, Base sand 3095 ft, abnd 3110 ft.

Cowley County: Gueda Springs—E. B. Shawver's Rogers 1, sw nw nw 9-34s-3e, pay 3318-24 ft, chat 3300 ft, td 3330 ft, pump 25 bbls.

Dickinson County: Wildcat—Carter's Tatman 1, c sw sw 6-15s-1e, Lansing 1932 ft, Miss 2591 ft, abnd 2626 ft.

Ellis County: Semi-Wildcat—Carter's Karlin 1, c ne sw 1-12s-18w, Arb 3627 ft, abnd 3645 ft.

Ellis County: Wildcat—Shell's Miller 1, nw ne se 27-12s-17w, Anhy 1290 ft, Ft. Riley 2184 ft, Florence 2286 ft, Cottonwood 2504 ft, Neva 2546 ft, Topeka 3085 ft, Lansing 3391 ft, Simpson shale 3688 ft, Dolomite 3695 ft, Arb 3710 ft, abnd 3790 ft.

Ellsworth County: Bloomer—Gulf's Grizzel 12, c n½ se ne 31-17s-10w, Arb 3243-44 ft, td 3254 ft, potential 1506 bbls.

Ellsworth County: Wildcat—J. J. Lynn's Heesch 1, c s½ nw sw 29-16s-10w, Lansing 3025 ft, Cherty Congl 3315 ft, Arb 3354 ft, abnd 3384 ft.

Jefferson County: Wildcat — Ira Keith's Smith 1, c ne ne 3-11s-18e, Oread 200 ft, B. Hertha 870 ft, sand 1605 ft, Miss 1634 ft, abnd 1777 ft.

McPherson County: Lindsborg—Luther Mackall's Hoglund 1, c w½ ne nw 18-17s-3w, Viola 3380 ft, td 3384 ft, 500 gals acid, 2000 gals acid, pump 804 bbls.

McPherson County: McPherson — R. E. Youker's Rolander 3, c n½ sw sw 30-18s-2w, Lansing 2340 ft, td 2398 ft, 3150 gals acid, pump 15 bbls oil and 3 bbls water.

Phillips County: Dayton—Carter's Dusin 2, c se se 35-2s-19w, Lansing 3113 ft, td 3311 ft, 8000 gals acid, pump 272 bbls.

Pratt County: Cunningham—Skelly's Larkin 4, ne ne ne ne 36-27s-11w, Lansing 3433-38 ft, td 3495 ft, set packer 3415 ft, 1000 gals acid, gas repressure well.

Rice County: Semi-Wildcat—Nelson et al's Anderson 1, Miss chat 3337 ft, td 3376 ft, pump 420 bbls oil.

Rice County: Cramm—Lauck & Moncrief's Sledd 2, c n½ ne sw 22-19s-9w, Arb 3215 ft, td 3234 ft, 1000 gals acid, pump 1040 bbls.

Rooks County: Laton—Broadview's Baxter E-1 c s½ ne ne 3-9s-16w, Lansing 3118 ft, td 3205 ft, 8000 gals acid, pump 429 bbls.

Russell County: Hall-Gurney—Shell's Ruby 3, nw ne ne 36-14s-13w, Lansing 2806 ft, td 3180 ft, pb 2835 ft, abnd.

Russell County: West Trapp—Pryor & Lockhart et al's Boxberger 1, c s½ ne sw 10-15s-14w, Arb 3222 ft, td 3230 ft, 1500 gals acid, pump 311 bbls.

Stafford County: Wildcat—Vickers' Knode 1, c w½ nw nw 14-25s-11w, Anhy. 532 ft, Topeka 2950 ft, Lansing 3444 ft, Congl 3838 ft, Miss 3847 ft, Kinderhook 3880 ft, Viola 3984 ft, Simpson 4085 ft, Arb 4155 ft, abnd 4170 ft.

OLD WELLS DEEPENED

Rice County: Wherry—Mid-Plains' Nelson 4, c n½ sw nw 12-21s-7w, Arb 3858 ft, otd 3456 ft, abnd 3904 ft.

Stevens County: Hugoton Gas — Republic Natural's Ratcliff 1, c ne 7-34s-38w, otd 2831 ft, Ft. Riley pay 2539-2832 ft, td 2832 ft, 1,514,000 gas, rock pressure 399 lbs.

WILDCAT STARTS

Barton County: Bartlett & Crum's Borr 1, ne se sw 12-17s-12w, rur.

Ellis County: Kansas Development Co.'s Warner 1, ne ne ne 4-11s-18w, mim.

Cities Service s Joy 1, ne ne se 24-12s-19w, lcn.

Pawnee County: Adair & Morton et al's Thompson 1, nw ne nw 16-22s-20w, lcn.

Reno County: Helmerich & Payne's Laviellet 1, ne ne se 23-22s-10w, dr.

Russell County: Sunray et al's Kansas Trust 1, nw nw nw 7-13s-14w, cellar.

North Texas

Jack County Wildcat Has Oil in Ellenburger

Jack County wildcat shows promise of oil production in Ellenburger. Confirmation test for Spring pool, Clay County, flows natural. Northwestern Grayson County Ordovician prospect to test upper shows. Second well pending in Haskell County pool.

Jack County: Taubert-McKee and Sinclair Prairie's Boyd Bros. 1, northeast corner of Seth H. Hazel Survey A-258, 3 miles south of Post Oak, running pipe to try for completion in about 15 ft of dolomite saturation drilled to 6435 ft. Drill-stem test at 6380-6430 ft in Ellenburger, topped at 6389 ft, yielded 180 ft of 41-gr oil and 240 ft oil-cut mud, estimated 60 percent oil, with tool open 95 minutes. This wildcat is due to make commercial producer after acid treatment. Wilcox Oil & Gas Co.'s Bloodworth 1, Wm. McDonald Survey A-380, abnd after test of Strawn saturation at 3810-70 ft, having plugged back from Ellenburger 6070-6218 ft.

Grayson County: Robt. Tolbert and Finston's Jewell 1, 3 miles west of Hagerman, fulfilled depth obligation in reaching Ellenburger at 8348-8403 ft, being second deepest for this horizon in district, and is due to be plugged back to test nominal shows in Basal Pennsylvanian.

Clay County: Continental's Spring 2, ¼-mile northeast of its Spring pool discovery, flowed 170 bbls oil natural 7-hour test 1-in tubing choke, sandy-lime 5595-5645 ft in Bend topped 5578 ft, 18 ft low. Acid treatment pending. Discovery well responded to initial treatment with acid the past week with flow 186 bbls oil in 1¾ hours, having used 7000 gals in broken saturation 5592-5630 ft.

Montague County: Sinclair Prairie's Jones 1, 1½ miles northeast of Forestburg and deepest of trio of wildcats being drilled by company in county, was coring dry lime 8190 ft, possibly middle Ordovician, and Collier 1 resumed coring after recovering light oil stain and odor 718-28 ft. Company's Henderson 1 had progressed to 6416 ft. Continental's Mueller 1, wildcat 6 miles east of Bowie, recovered oil load after using 4000 gals acid at 6602-21 ft in Viola, topped 6600 ft, then swabbed 4 bbls fluid hourly, averaging 50 percent fresh water.

Haskell County: Ed C. Lawson et al's Smith 1, offset to their Lawson pool discovery, landed 7-in 2609 ft to try for completion in Canyon sand 2699-2706 ft.

COMPLETIONS

Archer County: Scotland—Shell's Coleman 6-A, 330 ft out nec lot 3, ATNCL 74, flow 75 bbls oil and 22 bbls water, 2-in. acid 1000 gals, Mississippi perf 5410-25 ft, td 5699 ft, pb to 5627 ft.

Archer County: Wildcat—H. R. Theck et al's Duckworth 1, 330 ft out nec lot 5, J. W. Harris sub div, abnd 1458 ft.

Baylor County: Rendham—British-American's Green 4-K, T&NO 235, pump 56 bbls oil and 137 bbls water, acid 500 gals, Canyon 3054-60 ft.

Clay County: Jolly-Ross—Continental et al's Avis 3, 1538 ft from s and 440 ft from e lines blk 20, Rains CSL, flow 839 bbls ¾-in, acid 4000 gals, Bend perf 5400-50 ft, td 5525 ft.

Clay County: Wildcat—Bridwell Oil Co.'s Roop 2, 728 ft from ne and 1700 ft from nw lines blk 10, Thornberry subdiv, abnd 1450 ft.

Cooke County: Wildcat — Panhandle Ref. Co.'s Klement 1, 660 ft out sec of west 90-ac of south 300 ac, Geo. M. Casey sur A-198, abnd 2125 ft.

Cooke County—Grayburg Oil Co.'s Kleiss 3-B, J. W. Littleton sur, abnd 1800 ft.

Jack County—Wilcox O&G Co.'s Bloodworth 1, Wm. McDonald sur A-380, elev 987 ft, Strawn oil show 3810-70 ft, top Bend 5211 ft, Ellenburger 6070 ft, abnd 6218 ft.

Wichita County: K-M-A—Deep Oil Dev. Co.'s Munger 26-A, blk 31, KWVFL, pump 48 bbls. Strawn 3870-90 ft.

Wichita County: Potts—Consolidated Oil Co.'s Potts 2-D, c nw se H&TC 4, blk 7, K-M-A lime 3890 ft, Bend 4105 ft, Ellenburger 4516 ft, abnd 4589 ft.

WATER INPUT WELL

Young County—Cable Oil Co.'s Williams 13, W. C. Adams sur A-1364, sand 572-81 ft.

GAS INPUT WELL

Wilbarger County—W. T. Waggoner Est.'s Fee 36-AA, H&TC 14, blk 13, sand 1695-98 ft.

OLD WELLS DEEPENED

Cooke County: Wildcat—Joe Baldwin et al (was J. L. Anderson's) Osburn 1, 491 ft from n and 330 ft from e lines B. Sullivan sur A-581, otd (small pumper) 2320 ft, sand 2320-34 ft, td 2336 ft, pump 75 bbls 44-gr daily.

Clay County—J. M. Seaberry-H. B. Duncan's Tucker 1, 150 ft from n and 2300 ft from e of C. F. Stanley sur A-407, otd 1471 ft, abnd 1620 ft.

WILDCAT STARTS

Archer County—Bridwell Oil Co.'s Conrady 2, 495 ft from s and 1359 ft from w lines sec 23, blk 4, Clark-Plumb sur, lcn.

W. E. Production Co.'s Ebnother-Shell 1, 330 ft from e and 1200 ft from n lines blk 102, Harris Club ranch, lcn.

Clay County—J. J. Perkins & Cullum's Taylor 1-D, 610 ft from se and 1260 ft from ne lines of 82½-ac tr, blk 37, Bacon subdiv, lcn.

Wichita County—C. F. Schram et al s Laukhuf 1-A, 300 ft from w and 700 ft from s lines 40-ac lse, J. R. McDowell sur A-194, lcn.

West Texas

Abell Production Expanded Southeast

Confirmation tests in Fullerton deep pool, Andrews County, have favorable showings in Clear Fork. West outpost on Barnhart structure running low. Inside location in south extension of Sand Hills is dry in Ordovician. Abell field expanded southeast.

Andrews County: Magnolia's Ralph 1, C SE SE PSL Sec 11, Blk A-37, ¾ mile west of Fullerton pool discovery, recorded favorable structural position in entering oil-stained lime 6835 ft. Drill-stem test at 6845-6920 ft yielded 325 ft of gas-cut mud, and second test at 6920-7000 ft returned 700 ft gas-cut mud with trace oil. Coring resumed to tap main pay before making further test. Fullerton Oil Co.'s Wilson 2, west offset to discovery, was coring broken saturation 6940 ft, having recovered 450 ft rotary fluid with light cut of oil and gas at 6820-6935 ft. First porosity noted at 6825 ft, and Wilson 3, north of producer, was drilling lime 6350 ft. Mascho Oil Co.'s University-Sun 1, 2 miles northwest of Emma pool, awaiting decision as to whether pipe will be set for production test after recovering 385 ft oil- and gas-cut mud and trace water at 4468-4514 ft. Sulphur water zone in lime has not been reached. This prospect topped brown lime at 3830 ft and San Andres 3950 ft, elevation 3216 ft.

Reagan County: Amerada's University 1-R-C-a, mile west of Barnhart pool discovery, was drilling Ellenburger dolomite 9150 ft, having based black shale zone at 8966 ft, 54 ft low. Three additional tests are active in the area.

Pecos County: Geo. Abell et al's Blaydes 1, southeast edge of Abell field, flowed 675 bbls 39-gr oil initial, plus 5 percent salt water, ½-inch tubing choke, from Simpson sand 5301 ft. Magnolia's Loar-State 1, southeast outpost, awaiting orders at 6483 ft, having tested sulphur water in Ellenburger at 6282-6306 ft. Humble's Gregg 1, ½ mile south extension for original Apco pool and on strike towards south extension sector, responded to 1000-gallon acid treatment through perforations 4666-4711 ft for potential of 1067 bbls 41.6-gr oil, 7/8-in choke.

Crane County: Gulf's Waddell et al 39, south offset to Ellenburger production in lower end of Sand Hills structure, flowed sulphur water after using acid in Ellenburger at 5701 ft, and will try for completion in 4200-foot Permian.

Wildcats: Broderick & Calvert et al's Bryant 1, Midland County, drilling dry lime 4510 ft, having entered brown lime 4255 ft, elevation 2699 ft. In Lamb County, Stanolind's Hopping 1, ½ mile southeast of Fieldton, drilling anhydrite and shale 4260 ft, having entered San Andres at 3000 ft, elevation 3561 ft, drill-stem test at 3822-3962 ft yielded 300 ft mud. Rowan Drilling Co.'s Field 1, northwestern Yaokum County, drilling dry lime 4800 ft, top brown lime 4040 ft, elevation 3880 ft. Sun Oil Co.'s Shannon 1, 1¾ miles north by west of Olson pool, western Crockett County, logged nominal oil saturation 1575-80 ft, and top of lime 2012 ft, elevation 2541 ft, and is scheduled to set protection string near 2050-ft level.

COMPLETIONS

Andrews County: Fuhrman—J. W. Tripplehorn et al's Gowens-Sun 2, nwc PSL 12, blk A-43, flow 218 bbls 2-in, acid 4000 gals 4255-4458 ft.

Brewster County: Wildcat—Chester Dewey et al's Decies 1, c nw sw GC&SF 45, blk 4, abnd 250 ft.

Cochran County: Slaughter—Devonian Oil Co. et al's Duggan 17-A, nec lab 2, leag 55, Oldham CSL, flow 1132 bbls cas, acid 12,500 gals, 4943-5025 ft.

Magnolia's Mallet 24-J, nwc lab 17, leag 50, Scurry CSL, flow 1063 bbls cas, acid 10,500 gals, td 5045 ft.

Crockett County: Clara Couch, New Sand—Humble's Owens 1-B, c sw ne HE&WT 8, blk GG, new shallow sand, elev 2496 ft, rated 173,000 gas daily natural, Yates sand perf 1060-75 ft, td 1975 ft.

Crockett County: World-Powell—H. G. Eastham Jr. et al's Powell 1-A, se ne nw GC&SF 52, blk BB, pump 72 bbls oil, plus 71% water, acid 1000 gals 2542-2629 ft, td 2657 ft.

Ector County: North Cowden—Stanolind's Smith 28-G, 1995 ft from n and 4418 ft from e T&P 12, blk 43, T-1-S, pump 453 bbls, shot 537 qts 4109-4289 ft, td 4308 ft, pb to 4303 ft.

Hockley County: Slaughter — Honolulu's Mallet 13-A, sec lab 11, leag 52, Scurry CSL, flow 1743 bbls cas, acid 10,000 gals 4941-5014 ft.

Humble's Coons 1, 6120 ft from n and 440 ft from w lines PSL 11, blk X, flow 898 bbls 2-in, acid 10,000 gals perf 4925-5002 ft, td 5010 ft.

Magnolia's Mallet 17-G, swc lab 3, leag 50, Scurry CSL, flow 1266 bbls cas, acid 10,500 gals 4931-5008 ft.

Magnolia's Mallet 18-G, sec lab 3, leag 50, Scurry CSL, flow 1409 bbls cas, acid 10,500 gals, td 5005 ft.

Texas Co.'s Mallet 20-B, nec lab 1, leag 52, Scurry CSL, flow 1202 bbls cas, acid 14,000 gals 4970-5020 ft.

Texas Co.'s Slaughter 93, C lab 94, leag 38, Zavalla CSL, pump 246 bbls plus 11% bs&w, acid 7000 gals 4970-5000 ft, td 5030 ft.

Texas Co.'s Slaughter 117, sec lab 78, leag 38, Zavalla CSL, flow 1151 bbls cas, acid 12,000 gals 4955-5021 ft.

Texas Co.'s Slaughter 127, nec lab 96, leag 38, Zavalla CSL, flow 1039 bbls cas, acid 11,000 gals 4982-5026 ft.

Texas Co.'s Slaughter 121, sec lab 89, leag 38, Zavalla CSL, flow 1499 bbls cas, acid 12,000 gals 4965-5026 ft.

Texas Co.'s Slaughter 124, sec lab 77, leag 38, Zavalla CSL, flow 530 bbls cas, acid 12,500 gals 4950-5027 ft.

Texas Co.'s Slaughter 125, nec lab 76, leag 38, Zavalla CSL, flow 1722 bbls cas, acid 12,000 gals 4942-5035 ft.

Pecos County: Conry-Davis—Geo. Abell et al's Williams 1, near c lot 12, H&TC 15, blk 2, elev 2376 ft, abnd 4050 ft.

Pecos County: Walker—McDermott & Cooper's White-Baker 3-A, 1227 ft from e and 789 ft from s lines GC&SF 84, blk 194, abnd 230 ft.

Yoakum County: Wasson—American Liberty & Atlantic's Carpenter-Texaco 3, 440 ft from s and 1760 ft from e sec 733, flow 325 bbls flow valves, acid 10,000 gals 5040-5188 ft.

American Liberty & Atlantic's Herd 4, c se sw sec 795, flow 185 bbls, plus 13% bs&w, acid 10,000 gals 5005-5236 ft.

American Liberty & Atlantic's Knight 8, 2200 ft from w and 440 ft from s lines sec 733, flow 266 bbls 2-in, shot 450 qts 5180-5296 ft.

Drilling & Exploration Co.'s Hudson-Shell 5-C, c ne sw sec 834, flow 132 bbls ¼-in, acid 9000 gals 4960-5100 ft.

OLD WELL DEEPENED

Winkler County: Keystone—Gulf's Keystone 44, otd 3322 ft, flow 86 bbls 2-in, td 3668 ft, pb to 3450 ft.

WILDCAT STARTS

Crane County—Texas Co.'s University 1-K, c nw se sec 20, blk 30, 10¾-in 477 ft, dr 510 ft.

Pecos County—Gruber & Ringle's University-Humble 1, 1767 ft from s and 447 ft from e lines sec 19, blk 16, lcn.

J. N. Gregory et al's Nevill-Pure 1, c ne se H&GN sec 42, blk 12, sp.

Runnels County — Geo. Callahan-E. M. Wahlenmaier & Steve Currie's Rainwater 1, 600 ft s and 739 ft w of nec 250-ac tr, J. N. San Miguel sur 72, lcn.

TEXAS PANHANDLE

COMPLETIONS

Carson County—Rock Oil Co.'s Byrum 3, I&GN 188, blk 3, pump 58 bbls, td 3273 ft.

Gray County—S. & M. Oil Co.'s Worley 15, I&GN 64, blk 3, pump 42 bbls, 3126-3210 ft, td 3232 ft.

Stansylvania Oil Co.'s Finley 2, I&GN 105, blk 3, pump 115 bbls 3267-3333 ft.

Hutchinson County—Continental Oil Co.'s Sanford 1-D, 4290 ft from s and 330 ft from w lines H&TC 77, blk 46, pump 200 bbls 2750-62 ft.

E. J. Dunigan et al's Luginbyle 4, TWNG sec 4, blk J, pump 62 bbls 3062-68 ft, td 3142 ft.

U-Tex Oil Co.'s Ware 5-B, T.C. Ry 20, blk M-21, pump 308 bbls 3055-3160 ft, td 3174 ft.

WEST CENTRAL TEXAS

COMPLETIONS

Callahan County: Wildcat—J. D. Kynaston et al's Seale 2, 750 ft from s and 5300 ft from w lines J. D. Collins sur, abnd 1256 ft.

Coleman County—Anzac Oil Corp.'s Morris 1-S, Jas. Harris sur 77, abnd 2890 ft.

Jones County: Wildcat—Ungren-Frazier et al's Radford 1, nw se ne T&P 20, blk 16, elev 1672 ft, abnd 2651 ft.

Jones County—Butler-Horne Drlg. Co. et al's Wimberly 2-A, nec nw blk 106, DeWitt CSL, flow 690 bbls natural 30/64-in, sand 2218-30 ft.

WILDCAT STARTS

Comanche County—F. O. Akin et al's Pink Scott 1, c nw se H&TC 21, blk 2, lcn 3000-ft test.

Jones County—W. R. Seed and F. B. Evans' Walker 1, 330 ft out nwc of east 219-ac of 419-ac tr, G. Martinez sur A-254, elev 1708 ft, lcn.

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East Texas

Making Test of Showing In Anderson County Wildcat

Northeastern Anderson County prospective oil strike installing cable tools for test. Wood County assigned Trinity project. Opelika gets big distillate well.

Anderson County: Magnolia's Campbell 1, Concord geophysical prospect, changing to cable tools before drilling plugs from 7-in at 4520 ft, having plugged back from 4669 to 4540 ft in Woodbine, topped 4522 ft, being 783 ft high to failure situated 3 miles to southeast. Campbell 1 gave promise of opening low-gravity oil pool when drill-stem test at 4525-50 ft yielded 30 ft heavy asphalt oil, 750 ft oil-cut mud and 90 ft of rotary mud and brackish water. Magnolia controls all close-in acreage.

Wood County: Amerada's Kennemer 1, 660 ft south and 660 ft west of most northerly northeast corner of 157-ac tract, Joseph Knight survey, north portion County, is scheduled to explore Lower Trinity series to 8500 ft. This wildcat is two miles northwest of company's 6506-ft Paluxy failure.

Henderson County: Lone Star and Shamrock's Tullos 2, northeast portion Opelika structure, tested 145,000,000 ft gas, averaging 55 bbls distillate per million, on open-flow gauge, used 5000 gallons acid through Pettit perforations 8282-95 ft and 8368-86 ft.

The Texas Co.'s Brown 1, wildcat in east central part county, was awaiting orders in hard lime at 5552 ft.

COMPLETIONS

East Texas Field: Longview—C. A. Lee & R. W. Burnett's Boyd 1, 330 ft from w and 2250 ft from n lines H. W. Augustine sur, elev 411 ft, abnd 3780 ft.

T. W. Lee et al's P. A. Cole 1, 3120 ft from w and 1602 ft from n lines H. W. Augustine sur, abnd in Woodbine 3800-3814 ft.

Smith County: Chapel Hill—Magnolia's Shofner 1, 570 ft from w and 577 ft from nw lines 84-ac lse, R. H. Andrews sur, flow 460 bbl 42.5-gr oil, gas 730/1, 3/16-in, acid 4000 gals Pettit perforations 8219-51 ft, td 8291 ft.

Wood County: Hawkins—Humble's Atkins 9, 467 ft from e lse, J. P. Moseley sur and 933 ft north No. 3, flow 368 bbl ¼-in, Woodbine perforations 4710-16 and 4881-87 ft, td 4908 ft.

Humble's Kay 4, 467 ft out NEc 330.31-ac lse, J. P. Moseley sur, flow 449 bbl ¼-in perforations 4687-94 and 4830-35 ft, td 4847 ft.

Humble's Morrison 1-B, 467 ft out SEc 106.36-ac lse, M. A. Esparcia sur, Austin chalk 4332-4570 ft, Woodbine 4771 ft, abnd 5095 ft.

Humble's Ponder 3, 467 ft out SEc 146-ac tr, Wm. Herrington sur, flow 433 bbl ¼-in, perforations 4628-33 and 4833-39 ft, td 4861 ft.

WILDCAT START

Hopkins County—Rancho Oil Co.'s Geo. Stribling 1, 660 ft out of nwc 81.6-ac tr, Thomas Norris sur, 6 mi sw Sulphur Springs, dr 4410 ft.

Southwest Texas

Two New Fields; One Extended During Week

New fields were opened in Refugio and DeWitt counties, and a new sand was opened at Seeligson in Jim Wells County.

Refugio County: Hewitt & Dougherty's Rooke 6-A, 4 miles southwest of LaRosa field, perforated 7135-39 ft in Frio (16 shots), to flow 357 bbls 39.1-gr through 3/16-in choke; tubing 1210 lbs, casing 1460 lbs; gas-oil ratio 933/1; total depth 7656 ft. This opens a new field which will be called Rooke.

DeWitt County: Adams Oil & Gas

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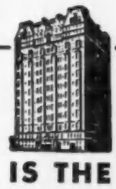

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CLAUDE H. BENNETT, *General Manager*

Co. et al's Berch 1, J. Kimbering Survey, 3 mi e Yorktown, flowed 180 bbls 63-gr distillate with 6 million gas through perf in Wilcox at 7192-7204 ft; ¼-in choke; tubing 2000 lbs, casing sealed; total depth 9153 ft. Opens new field; shut in.

Jim Wells County: Magnolia's A. A. Seeligson 29, Seeligson field, has a new sand in Frio at 6420-22 ft in hole drilled to 7013 ft. Electric log showed sand 6420-30 ft. Cleaned through ¼-in choke, tubing 2900 lbs, casing 2650 lbs, built up to 3200 pounds when flow of gas and condensate was shut in.

Bee County: Luling Oil & Gas Co.'s Slick 1, 1¼ miles northeast outpost South Ceasar Carrizo sand field, logged oil sand 6549-52 ft, also sand series with gas and oil to 6602 ft; coring ahead.

Duval County: W. C. McBride's Murphy 1, mile northwest Labbe field, drilled to 3306 ft ran electric log and side wall sampled sand 2505-23 ft, just below Chernoskey. Will test.

LOWER GULF COAST

COMPLETIONS

Hidalgo County: Nichols—Royal O&G Co.'s Yturria 3, lot 8, por 44, 66.13 bbls 40-gr, 3/32-in ch, 420 lbs tp, 800 lbs cp, perf 3924-29 ft, gas/oil 740/1, sand 3920 ft, td 3935 ft.

Jackson County: Maurbro—J. L. Collins & Co.'s McCrory & Westhoff 1, Clare Lge, 482 bbls 25-gr, 1/4-in ch, 550 lbs cp, 750 lbs tp, gas/oil ratio 236/1, perf 5215-19, sand 5215 ft, td 5225 ft.

Humble's Mauritz 3-B, blk 9, White Lge, 303 bbls 25.4-gr, 1/4-in ch, 250 lbs tp, 450 lbs cp, gas/oil ratio 198/1, sand 5212 ft, td 5246 ft, pb to 5238 ft.

Humble's Robbins 10, blk 9, White Lge, 383 bbls 25.2-gr, 1/4-in ch, 500 lbs wp, gas/oil ratio est 600/1, sand 5231 ft, 5 1/2-in 5225 ft, td 5234 ft.

Jackson County: N. LaWard—Gulf's M. Pickering 1, P. Scott sur, blk 25, 132 bbls 25.6-gr, ⅛-in ch, 620 lbs tp, 410 lbs cp, gas/oil ratio 170/1, perf 5203-11 ft, sand 5203 ft, td 5218 ft.

Humble's Four Way 1-B, blk 77, LaWard sub, 82.5 bbls 25.2-gr, ⅛-in ch, 500 lbs tp, cas sealed, gas/oil ratio 648/1, perf 5215-21 ft, td 5222 ft.

Jackson County: Texana—Moore & Ahern's G. W. Clement 1, blk 24, Clement sub, Margulina 5099 ft, abnd 6763 ft.

Jackson County: W. Ganado—Hutchins & Ferguson's W. E. Gary et al 1, J. Mathis ¼th Lge, 1 mi se production, abnd 6506 ft.

Jim Wells County: Orange Grove—Kilgore Dev, Inc's J. Polasek 1, B. Lopez de Jean Gr, 64 bbls 33.3 gr, ⅛-in ch, 500 lbs tp, 1600 lbs cp, gas/oil ratio 410/1, perf 5084-86 ft, sand 5070 ft, td 5092 ft.

Jim Wells County: Seeligson—Shell's Seeligson 2, Millican sur, 129 bbls 41-gr, 7/64-in ch, 1175 lbs tp, 1225 lbs cp, gas/oil ratio 800/1, sand 5930 ft, 5½-in 5955 ft, td 6000 ft.

Sun's Canales 7, sec 182, 157 bbls 43.6-gr, 7/64-in ch, 1140 lbs tp, 1200 lbs cp, gas/oil ratio 700/1, perf 5963-70 ft, sand 5963 ft, td 6000 ft.

Live Oak County: Wildcat—H. Coquat et al's Riser 1, E. Ramirez gr, 1½ mi sw Mikeska, abnd 5100 ft.

Nueces County: Agua Dulce—Simmonds & Perry's Simmonds 2, Agua Dulce Gr, 141.5 bbls 41.6-gr, ¼-in ch, 850 lbs tp, 1990 lbs cp, gas/oil ratio 678/1, perf 6880-90 ft, td 6939 ft.

Sam E. Wilson Jr. et al's S. A. Jt. Stk. Lnd. Bnk. 4-A, sec 18, abnd 5958 ft.

Nueces County: Bentonville-King—Southern Minerals' R. King 25, sec 6, 64.99 bbls 39.2-gr, 7/64-in ch, 600 lbs tp, 1050 lbs cp, gas/oil ratio 1325/1, perf 5594-5602 ft, td 5604 ft.

Nueces County: Stratton—Southern Minerals' Stratton Community 36, sec 199, 72 bbls 42.8-gr, 7/64-in ch, 920 lbs tp, 1180 lbs cp, gas/oil ratio 745/1, perf 6631-47 ft, sand 6626 ft, td 6665 ft.

Refugio County: McFaddin—Colton & Colton & Crighton's F. W. Fagan 2, N. Fagan sur, salt water 5664 ft, abnd 5706 ft.

Cox & Hamon's Marberry 1, N. Fagan sur, 109.2 bbls 26.9-gr, ⅛-in ch, 610 lbs tp, 850 lbs cp, gas/oil ratio 353/1, perf 5632-37 ft, sand 5625 ft, td 5664 ft.

San Patricio County: Odem—Seaboard's S. Nunez 2, blk 7-A, 51 bbls 40.1-gr, ⅛-in ch, 1075 lbs tp, 1800 lbs cp, gas/oil ratio 4040/1, perf 5491-96 ft, sand 5485 ft, td 5546 ft; new Frio sand.

Seaboard's Spierkerman 1, blk 15-A, 100 bbls 32.2-gr, ⅛-in ch, 1475 lbs tp, 2050 lbs cp, gas/oil ratio 4000/1, perf 5320-22 ft, sand 5314 ft, td 5325 ft.

Victoria County: Wildcat—Continental's Crain 1, J. Smalley sur, 9 mi e Nursery, abnd 4540 ft.

Ike Howeth's J. L. Beck 1, Escalera gr, 5 mi nw Victoria, abnd 4610 ft.

Willacy County: Willamar—Pan American's Garcia 1, Sh 13, 132 bbls 31.5-gr, 3/16-in ch, 400 lbs tp, cas sealed, gas/oil ratio 250/1, perf 7880-7909 ft, td 7969 ft.

WILDCAT STARTS

Hidalgo County—Phillips' Daskam 1, 660 ft w el 777-ac lse, 4126 ft s Highway 4, por 45, 3½ mi se Sullivan City, 7000-ft test.

Nueces County—Las Tecas Pet. Co.'s T. C. Gallagher 1, 1056 ft n, 412 ft e & w lines 55.34-ac lse, E. R. Oliver sur, ab 198, 12 mi w Clarkwood, lcn 6500-ft test.

Refugio County—Hewit & Dougherty's Rooke 16, 660 ft s & e lines blk 26, Sub c, Aldrede gr, 1½ mi n Rooke field disc, mi for 7500-ft test.

SOUTHWEST TEXAS

COMPLETIONS

Duval County: Casa Blanca—Magnolia's DCRC 6, Sec 88, abnd 1400 ft.

Duval County: Driscoll—Continental's Driscoll 77-A, Sec 482, abnd 3310 ft.

Duval County: Hoffman—Magnolia's Well 29, sec 495, abnd 2815 ft.

Duval County: Piedre Lumbre—Government Wells Oil Co.'s Lundell 5, sec 364, abnd 2316 ft.

Jim Hogg County: Colorado—Humble's King-Colorado 62-B, Las Moretas Gr, 170.89 bbls 46.5-gr, 3/16-in ch, 300 lbs tp, 625 lbs cp, gas/oil ratio 210/1, sand 2866½ ft, td 2879 ft.

Starr County: Rincon—Continental's Slick 69-B, sec 506, 235 bbls 39.7-gr, 12/64-in ch, 550 lbs tp, 1120 lbs cp, gas/oil ratio 374/1, perf 4000-12 ft, td 4045 ft.

Starr County: Sun—Humble's Barrera 1, tr 10, Los Retachez gr, 109.62 bbls 45.6-gr, ⅛-in ch, 665 lbs tp, 635 lbs cp, gas/oil ratio 590/1, sand 4645 ft, td 4677 ft.

Webb County: Adami—Stratton Oil Co.'s Frederick 1, sw nw sec 344, outpost, abnd 1178 ft.

Webb County: Killam—Anderson & Killam's Laurel 3, sec 333, 8.27 bbls 22-gr, pumping, perf 2005-15 ft, sand 2007 ft, td 2080 ft.

Webb County: McLean—Magnolia's McLean 4, sec 611, sw sand 3298-3305 ft, abnd 3320 ft.

Webb County: Wildcat—O. W. Killam's Puig 1, blk 120, Albercas gr, 3 mi s McLean field, abnd 2477 ft.

Zapata County: Escobas—Dulup Oil Co.'s Garcia 3-B, Sh 3, Las Comitas gr, abnd 425 ft.

Zapata County: Wildcat—Fansler, O'Hern & Allison's J. V. Cuellar Jr. 1, lot 4, blk 2, Pappas sub, Por 34, 2½ mi se Zapata, abnd 2011 ft.

WILDCAT STARTS

Starr County—Cottonwood Corp.'s Z. Salinas 1, 1000 ft w l, 1750 ft s l 1220-ac lse, La Sacatosa gr, 30 mi nw Rio Grande City, Sacatosa area, lcn 2250-ft test.

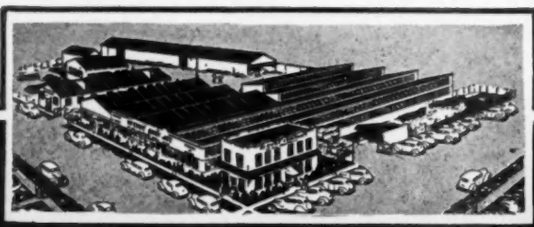
Sun's B. G. de Garcia 1, 660 ft wl, 8600 ft sl of 3200-ac lse, sh 5, por 98, 14 mi e Rio Grande City, sp 7000-ft contract.

Webb County—O. W. Killam's A. M. Bruni 1, 660 ft n and e lines blk 7, Brown sub, Albercas gr, 8 mi se Mirando City, ne Glen field, lcn 3500-ft test.

SOUTH CENTRAL TEXAS

COMPLETION

Bastrop County: Bee Creek—R. R. Ogden's J. W. Miears 4-E, Carper sur, 23 bbls 38-gr oil plus 40% sw on pump, acidized 2000 gals, Austin chalk 2178 ft, 5½-in cas 2154 ft, lower part slotted, td 2207 ft.



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Texas Gulf Coast

Lake Creek Well Sets Depth Record for Area

Lake Creek outpost extends production, opens new sand, establishes deepest production in Texas; Pure opens distillate field, Alief area, Harris County; second well completed at Mercy, San Jacinto County.

Lake Creek: Deepest production in Texas was opened at Lake Creek in Montgomery County last week with Superior Oil Co. completing South Texas Development Co. 1 in perforations at 11,775-815 ft in Wilcox sand.

Besides being the deepest producer in the state, the well extends production ½ mile east and opens a new sand. It is also believed the oil is flowing from the deepest level inside the Wilcox, the formation having been topped between 8400 and 8500 ft.

On a potential test, the well flowed 213 bbls 52-gr oil and 3 million cubic ft of gas through ¼-in choke with 2850 lbs tubing pressure. Total depth is 12,259 ft. The well has been watched with increasing interest due to reports it was reported running high structurally and also to its location as an outpost. It was drilled to 10,300 ft where casing was set and a series of tests made of all sands to that depth. Only the 9700-ft sand showed production.

With this completion, the field now has 8 producers and 1 dry hole. Contract has been awarded for construction of a plant to cycle the heavy flow of gas from some of the wells.

Harris County: Pure Oil Co. has opened a distillate field in the Alief area

with Albanese 1 flowing 37 barrels 52-gr distillate and 3,980,000 cubic feet gas through 24/64-in choke from perf 8066-80 ft in Yegua sand. Tubing pressure was 900 pounds, casing 850. Two tests at lower depths, but recovered gas, mud, and water. Total depth is 8637 ft.

San Jacinto County: Shell Oil Co. has completed second well northeast of production at Mercy. Dunnam 1, coring the Wilcox about normal with the discovery well, flowed 577 bbls 37.7-gr oil through ¼-in choke from perf 8272-78 ft.

COMPLETIONS

Brazoria County: Old Ocean—Harrison & Abercrombie's Armstrong 11, Polly & Chance sur, sand topped 10,070 ft, flow 480 bbls ¼-in, 42-gr, gor 14,010/1, td 11,028 ft.

Chambers County: Fig Ridge—J. M. Frost's Fee 5-A, 467 ft fr n l & 467 ft fr e l ne of nw sec 95, sand 8500 ft, flow 178 bbls ⅛-in, 35.3-gr, gor 704/1, td 8600 ft.

Harris County: Wildcat — George Strake's Phenix Dairy 1, 417 ft fr s l & 294 ft fr w l 40-ac lse Peter Craft sur, perf 7190-93 ft, flow 56 bbls 48.2-gr, 11/64-in, tp 2000, gor 16,300/1, td 7991, new field.

Jefferson County: Lovell's Lake—Humble's Broussard Trust 35, M. Grange sur, sand 7802 ft, flow 132 bbls ¼-in chk, td 7806 ft.

Polk County: Wildcat — Sinclair Prairie's Jones 1, 2 mi s Goodrich, 3500 ft fr ne l & 2500 ft fr se l 589-ac tr, A. Viesca sur A-77, abnd 10,117 ft.

Wharton County: Withers—F. W. Michaux' Pierce Est 10-A, T. Westall sur A-65, perf 5346-62 ft, flow 179 bbls 25.8-gr, 10/64-in, tp 575, cp 525, gor 307/1, td 5363 ft.

WILDCAT STARTS

Harris County—H. Merlyn Christie's Foster 1, 3 mi ne Humble field, 10,330 ft sw alg se l J. W. Asbury sur, lcn 8500-ft Frio test.

Matagorda County — Stanolind's Buckner Orphans Home 1, LaTulle area, James Moore sur, lcn 10,500-ft test.

Louisiana Gulf Coast

Production Test Due In Hayes Wildcat

Test scheduled in second well in Hayes area, Calcasieu Parish; drill pipe stuck in Easterwood wildcat, Acadia Parish; two tests scheduled north of Lake Salvador field.

Calcasieu Parish: Gulf Refining Co. is preparing to test Calcasieu National Bank 2, wildcat east of the discovery blowout well in the Hayes area. Completion will be made through liner in sidetracked hole. The well is bottomed at 11,685 ft with sand encountered at 11,612-658 ft. Operators have been testing plug and cement job several days preparatory to testing.

Acadia Parish: Continental and Sun are fishing in Homeseekers 1, wildcat in the Easterwood area. The well was in shale at 12,130 ft, deepest test ever drilled on the prospect, when drill pipe became stuck. Although official information has not been released, only slight gas shows are reported to have been encountered so far.

St. Charles Parish: Gulf Refining Co. has staked tentative locations for two wildcat tests 3 miles north of Texas Co.'s Lake Salvador field. Canals are being dredged, and it is expected work will not begin for about two months. Locations are on the Delta Securities block, both being in 13-15s-21e.

Rapides Parish: Phillips Petroleum Co. has made location for the third well in the Deville (Big Island) field since the discovery well was completed a few weeks ago in Wilcox. Location is Wahlen-Brewer 1, sec 14-4n-3e.

COMPLETIONS

Acadia Parish: Wildcat—Vincent & Welch's Ardoin 1, West Tepetate area, fr se cor sec 19, go n 70 deg 34 mins w 1653 ft, thence n 19 deg 26 mins e 1869 ft in 19-17s-2w. Tried blow out 9217 ft, 9354 ft, 9445 ft, abnd 9445 ft.

Ascension Parish: Sorrento—Pan American's

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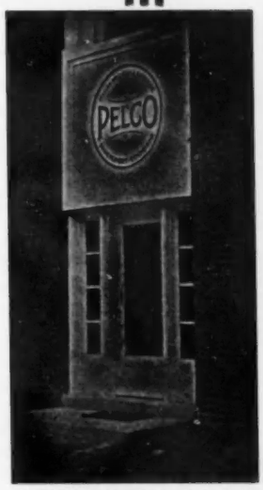

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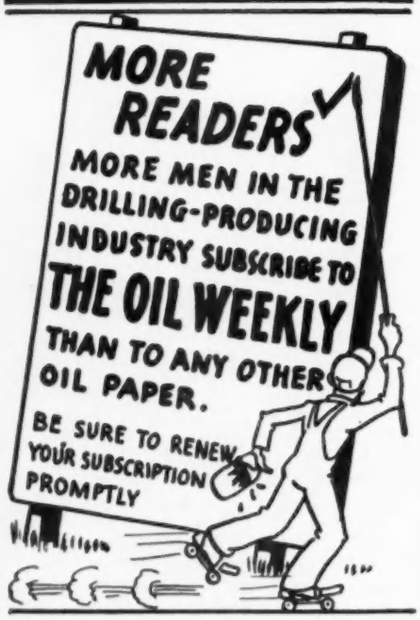
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United Land 20, nec 35-10s-4e, nw flank dome, perf 4134-42 ft, gas, no gauge, td 4522 ft.

Cameron Parish: West Hackberry—Stanolind's State-Black Lake 62, 3080 -ft n alg e line fr se cor sec 17, thence 2273 ft w at ra in 17-12s-10w, perf 9210-40 ft, flow 44 bbls 2 hrs, ¼-in, tp 890, td 9326 ft.

Iberville Parish: Bayou Choctaw—Carter's Wilberts 15, 1450 ft w & 1681 ft s of ne cor 53-9s-11e, abnd 6129 ft.

Jefferson Davis Parish: North Roanoke—Union Sulphur's Levergne 1, 1220 ft n & 491 ft w se c sw 6-9s-3w, north flank, abnd 9500 ft.

Plaquemines Parish: Grand Bay—Gulf's State-Grand Bay 16 QQ-195, 3978 ft e alg nl sec 5 fr nw cor same, & 2310 ft s at ra in 5-20s-19e, perf 8757-62 ft, flow 356 bbls 5/42-in, tp 1750, td 8765 ft.

St. Charles Parish: Paradis—Texas Co.'s LLE-Paradis 20, 660 ft e & 1982 ft n of sw cor 5-14s-20e, perf 10,435-445, flow 403 bbls, 3/16-in, td 10,490 ft.

St. Landry Parish: Fort Barre—Pan American's Garland 13, 3090 ft sw alg nwl fr nw cor, thence 670 ft e at ra in 4-6s-5e, perf 6490-6508 ft, flow 225 bbls, 9/64-in, tp 1040, gor 300-1, td 6759 ft.

West Baton Rouge Parish: West Port Allen—Amerada's Wilberts 6-B, 660 ft n & w of se cor 25-7s-11e, perf 9132-38 ft, flow 215 bbls, 9/64-in, tp 1500, csg sealed, td 9950 ft.

North Louisiana

Richland Test Wet in Cretaceous; to Try Wilcox

Richland Parish wildcat shows salt water; new wildcat for Lake Concordia; outpost staked at Waskom; Carthage extension looms.

Richland Parish: Bobby Manziel and associates' Wooten 1, NE NE 28-17-16, wildcat, showed salt water in Cretaceous at 2122-66 ft. Operators squeezing for test in Wilcox.

Lake Concordia: California Co. made location for State 1, Section 36-8n-9e, a wildcat to be an underwater test in Lake Concordia.

Waskom: First National Petroleum Trust staked location for M. G. Armstrong 1, Simpson Holloway Survey, Harrison County, Texas, ¾ mile west of Pettit and Travis Peak wet gas production.

Carthage: Glassell & Glassell's Frost 2, Carruth Survey, Panola County, Texas, completed but ungauged after perforations at 5626-65 ft and 5824-5942 ft, making gas to extend Carthage gas production one mile west.

COMPLETIONS

Claiborne Parish: Haynesville—Ohio's A. Seegars 1, Acct 2, ne se 9-23n-8w, flow 768 bbls, td 5414 ft.

LaSalle Parish: Nebo—H. L. Hunt's Goodpine F-87, ne ne 28-7n-3e, pump 108 bbls oil 12 bbls water, 4232 ft.

H. L. Hunt's Goodpine F-88, se sw 21-7n-3e, pump 109 bbls oil, 3 bbls water, 4122 ft.

Placid Oil Co.'s Deville 1, nw sw 38-7n-3e, pump 104 bbls oil, 6 bbls water, 4444 ft.

LaSalle Parish: South Olla—Placid Oil Co.'s Turnley 1, se nw 26-9n-2e, pump 97 bbls oil, 8 bbls water, 2917 ft.

WILDCAT START

Concordia Parish—California Co.'s State Lease (No. 429) No. 1, Lake Concordia, surface lcn, start at sec 36-8n-9e, thence s 42 deg 9 minutes west 1272 ft to location; bottom hole location; approx 575 ft s 46 deg east from surface lcn, mat.

Arkansas

Buckner Northwest Limit Defined

Buckner producing limits defined by dry hole to northwest; rain hampers drilling activity; two locations at Mount Holly, one at Midway, one at Macedonia.

Buckner: E. G. Bradham's Key 1, NW NW 7-16-22, was abandoned at 7325 ft, defining producing limits of this oldest Smackover lime field to northwest. Buckner was discovered in November, 1937.

Drilling Hampered: Excessive rain last week hampered Arkansas drilling, two of five drilling operations at Midway, being shutdown due to weather. Both drilling operations at Dorcheat, Columbia County, also shutdown for same cause as is lone active operation at McKamie.

Locations: Two locations staked at Mount Holly, Union County, both by Placid Oil Co. as follows: J. C. Moody 1, C SE SE 9-17-18, and W. T. Lewis 1, C NW NW 10-17-18. At Midway, Southwood Oil Co. staked Hodnett 1, C NW NW 18-15-23; and in Macedonia J. K. Hughes Oil Co. staked Souter 1, S½ NW 21-18-21.

COMPLETION

Ouachita County: Wildcat—Milam & Bond's Robinson 1, nw ne 6-15-18, elev 213 ft, Nacatoch 1408, Tokio 2300 ft, abnd 2507 ft.

WILDCAT START

Little River County—W. S. King's Tootle 1, nec se ne 8-13-31, dr.

Southeastern States

Tinsley Soon to Pass From Drilling Status

Tinsley continues dormant, with only two active operations, both standardizing; two new wildcats to be drilled soon; Sharkey County wildcat shows mud in test; new location at Pickens-Sharpsburg.

Tinsley: Only rig running at Tinsley is at salt water disposal well of Roeser & Pendleton on Stevens lease. Two tests waiting on standard rig to pump. Two completions during last week, no locations. Apparently Tinsley soon to be missing from drilling report for first time since discovery on August 29, 1939.

Wildcats: Amerada expected to announce location soon on wildcat block near Hermanville, Claiborne County, and Harry Elliott preparing to start wildcat, Lanneau 1, Irreg. Section 37-6n-2w, Adams County.

Sharkey County: E. C. Johnston & Sam Cook's Sharkey County wildcat, Klaus 1, NE NE 19-11n-7w, showed 600 ft drilling mud in 15-minute drill-stem test 3279-89 ft and drilling ahead. Top gas rock 3336 ft (elevation 105) which is 54 ft lower than lone completion in Cary district, same county. Base of gas rock and top Paluxy in Klaus 1 was 3373 ft.

Sharpsburg-Pickens: Phillips staked

You may have surplus equipment that is urgently needed by some other operator. See the new feature:

USED EQUIPMENT FORUM

Page 66 of this issue

location for John Whitworth 2, C NW SE 4-11n-3e.

COMPLETIONS

Yazoo County: Tinsley—Carl Jones' Walker 5, sec sw ne 2-9n-3w, elev 295 ft, Selma chalk 4853, Woodruff 4952, pump 14 bbls hour, td 4962 ft.

Charles A. Perkins et al, M. Sorrells 1, c nw se 32-10n-2w, abnd 6500 ft. (Tuscaloosa).

ALABAMA

COMPLETION

Clarke County: Wildcat—W. R. Davis' Scotch 1, c ne nw 14-10n-3e, elev 168 ft, Midway 1031, Selma chalk 1490, Eutaw 2642, Tuscaloosa 3385 ft, abnd 4043 ft.

California

Ratio of Wildcat Failures Is High

Three Kern County wildcat projects abandoned while extension in fourth area indicated; abandonment of two Los Angeles County exploratory projects and one Tulare County test also reported.

Kern County: Texas Co.'s semi-wildcat, Bowerbank 24-C, Sec 24-29-24, Buttonwillow - Bowerbank area, failed on test interval 3370-3350 ft and is being abandoned. Bottom was at 4950 ft.

Eocene test of Shell Oil Co., Curry 1, Sec 20-25-26, Delano area, recovered muddy and clear water on test of interval 6288-6315 ft and is being abandoned. Barren Vedder topped 5395 ft, basement at approximately 7240 ft. Project bottomed 7250 ft. Another test in area is expected to be made by company.

Seaboard's Fuhrman 1, Eocene test in Sec 28-28-28, Kern River field, was bottomed at 5261 ft after failure to pick up showings and has been abandoned.

Continental Oil Co. appears to have found an easterly extension of the Shafter-Semitropic area in Neuman 1, Sec 36-27-24, which topped Rio Bravo oil sand at 12,785 ft, 20 ft higher structurally than in KCL 2, discovery well of field.

Los Angeles County: Tide Water has abandoned Mission 1 wildcat in Sec. 26-3-16, Aliso Canyon, area which was bottomed at 9291 ft and swabbed muddy water from interval 3150-3225 ft on test.

Third project of Western Gulf Oil Co., Lechler No. 3, Oak Canyon area, is being abandoned after coring into gray sand at 7032 ft.

Tulare County: Continental's Pixley Community 1, Sec 9-23-25, Pixley area, is being abandoned after entering basement rock at 7906 ft without picking up worthwhile showings. A second test may follow.

COMPLETIONS

Fresno County: Raisin City area—Shell's Properties Incorporated 37-18; 986 ft n, 1598 e sw cor 18-15-18, flow 384 bbls 25.5-gr, 15/64 bean, perf 5258-5266 ft, td 6078 ft, pd 5266 ft.

Fresno County: Richgrove area—Shell's Curry 1, 1978 ft n, 1995 e sw cor 20-25-26, barren Vedder 5395 ft, abnd 7250 ft.

Kern County: Midway-Southeast area—Western Minerals Co.'s USA 37-25, 990 ft n, 990 w S¼ cor 25-11-23, abnd 1700 ft.

Kern County: Midway-Sunset—Chanslor-Canfield, Midway Oil Co.'s No. 30-17, 250 ft n, 250 e w¼ cor 17-32-23, abnd 2433 ft.

Kern County: Rio Bravo—Superior's Geissinger 4, 612 ft s, 522 w ne cor w½ nw 35-28-25, no estimate, 89 ft perf 11465 ft, td 11515 ft.

Western Gulf's Jack 58-21, 330 ft n, 2974 e sw cor 21-28-25, Rio Bravo 11640 ft, Grit zone 11,727 ft, Vedder 11,735 ft, abnd 11,754 ft.

Los Angeles County: Oak Canyon—Western Gulf's Lechler 3, 1130 ft n, 955 e c 31-5-7, Lechler zone 6692 ft, abnd 7595 ft.

Los Angeles County: Wilmington—Wilmington Pac. Pet. Co.'s Meeker 2, 251 ft n, 180 w Denni & Lakme, flow 205 bbls, perf 2690-2875, 2955-3200, 3370-3640 ft, td 3640 ft.

Ventura County: Rincon—Bond Development Co.'s Rincon 1, 889 ft s, 928 e w¼ cor 8-3-24, cored gray sand 5125-5145 ft, Miocene 2775 ft, Miley shale 5050 ft, abnd 5480 ft.

Ventura County: Ventura Avenue—Shell's Taylor 153, 735 ft n, 8110 w c/l No. 11, flow 2149 bbls 28-gr, 40/64-in bean 525/800 lbs, perf 9275-8935, 8817-8553, 8512-8422, 8384-8193 ft, td 9281 ft.

OLD WELLS RECONDITIONED

Los Angeles County: Wilmington—Royalty Service Corp.'s Keagy 1, 101 ft e, 101 n sw cor Keagy lease, pump 140 bbls 14-gr, 981 ft perf 3598 ft, otd 3600 ft, whipstocked from 2673 to 3600 ft.

WILDCAT STARTS

Merced County—T. W. A. O. Co.'s Turlock, 37-18, grading roads, Turlock area.

Santa Barbara County: Standard's Rice Ranch 1, 34-9-34, lcn, Orcutt area.

Ventura County—Volunteer Petroleum Co.'s Tar Creek 3, 28-5-19, lcn, Sespe area.

Rocky Mountain Area

Wildcat Operations Started in Three States

Wildcats start in Montana, Utah, and Nebraska. Pilot Butte, Wyoming, deep test enters Amsden formation.

Dupeyer Area: Texas plans three wildcats on a 68,000-acre block in the Dupeyer area, Pondera County, Montana. Wells will be drilled with rotary equipment to around 3800 ft, and one of them will be carried for a test of the Madison.

Vernal, Utah: Union Oil Company of California is letting contract for a shallow test to drill on a seismograph structure in Township 4 South, Range 20 East, Uintah County, Utah. Company

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Frontier County: Sinclair Prairie Oil Co. is spudding Brown 1, C SW SW 21-5n-29w, rotary, seismograph structure, Frontier County, western Nebraska.

Pilot Butte: Superior Oil Co. and British-American Oil Co.'s Tribal 1, SE SW SW 15-3n-1w, deep test, Pilot Butte field, Fremont County, topped Amsden 6704 ft, drilling 6757 ft.

MONTANA
COMPLETIONS

Glacier County: Cut Bank—Glacier Production Co.'s Thayer 2, c sw ne 28-33n-5w, swabbing 167 bbls, Lower Cut Bank 3002-17 ft, td 3018 ft.

R. C. Tarrant's Haglund 9, c sw se 13-34n-6w, abnd 3010 ft.

Texas Co.'s Lindquist 7, c nw ne 20-32n-5w, swabbing 30 bbls, Upper Cut Bank 2814-18 ft, td 2850 ft.

WYOMING
COMPLETIONS

Big Horn County: Garland—Ohio's Utah-Wyoming 3, Lot 57, 33-56n-97w, flow 211 bbls, 118 holes opposite Embar 3150-94 ft, Madison 3747-4114 ft, td.

Natrona County: Iba Area—Iba Development Co.'s Brown 1, c ne se 25-32n-82w, abnd 1885 ft, unable to shut-off water.

Park County: Oregon Basin—Yale Petroleum Corp.'s Atherly 1, sw sw sw 33-52n-100w, owd from 2785 ft, flowing 720 bbls, Embar 3534-88 ft, td.

Sublette County: Big Piney—Sunset Oil & Gas Co.'s 1, ne se ne 10-29n-113w, abnd 248 ft.

Sweetwater County: Lost Soldier—Sinclair Wyoming Oil Co.'s Unit 104-A, c sw nw 11-26n-90w, 468 bbls, gas lift, Tensleep, td 4165 ft.

Michigan

Roscommon North and West Tests Failures

Roscommon pool's Traverse horizon cut off on west and north. Continental likely to drill St. Peter sand in Calhoun County.

Wildcats: Continental Oil Co.'s Bonnett 1, E½ SE SW 8-2s-6w, Calhoun County, second test on a big core-drilled block, probably will be carried to St. Peter sand. It was drilled to 1580 ft with rotary, from 1580 to 2960 with cable tools, and from 2960 has been back on rotary to 3800 ft.

C. W. Teater's Syers 1, 1-19n-13w, Lake County, structurally high well, logged Monroe lime objective 3115 ft and abandoned at 3225 ft.

Wallace Markle's Ackerman 1, SW SW SW 8-17n-14e, Huron County, shut down 2700 ft for orders after missing objective 2600 ft. Monroe pay horizon, logged on initial deep well half mile farther east last year.

Roscommon District: Dundee lime will be tested on west and north flank of Headquarters field following dry holes in objective Traverse horizon on Sun Oil Co.'s State A2, N½ NW SW 33, and Pure Oil Co.'s State B4, N½ NW NW 34, both 21n-3w.

Sauble Area: W. P. Shoemaker's Maston 1, 16-19n-14w, discovery well, Lake County, was packed off with clay and gravel, and cemented 5-in after tests of water showed source as upper Marshall beds. Wildcat produced 200 barrels day initially from Traverse at 2114 ft, but was off production three days later when water content rose to 30 percent of fluid.

COMPLETIONS

Allegan County: Trowbridge—Earl Gromer's Bridgeman 1, ne nw nw 32-1n-13w, Traverse 1355-58 ft, pump 52 bbls after acid, td 1358 ft.

Bay County: Kawkawlin—Gulf's Kircher 1, s½ se ne 2-14n-4e, Dundee 2720-2865 ft, flow 131 bbls after acid, td 2867 ft.

Cass County: Porter—R. W. Atha's Carter 1, nw sw sw 6-7s-13w, Traverse 942-948 ft, abnd 949 ft.

Gratiot County: Wildcat—Chartiers Oil Co.'s Anderson 1, se ne sw 31-12n-3w, Dundee 3276 ft, abnd 3450 ft.

Lake County: Wildcat—C. W. Teater's Syers 1, s½ ne ne 1-19n-13w, Dundee 3032 ft, Monroe 3115 ft, abnd 3225 ft.

Osceola County: Reed City—Ohio's Reber 1, n½ nw se 32-18n-10w, Monroe 3572-99 ft, flow 27 bbls 1st hr, td 3600 ft.

Ohio's Riggs 1, n½ sw nw 5-17n-10w, Monroe 3571 ft, pay 3602-17 ft, flow 217 bbls 1st hr, td 3617 ft.

Roscommon County: Headquarters—Freeman Oil Co.'s State A5, n½ sw sw 34-21n-3w, Traverse 3360-65 ft, flow 51 bbls 1st hr, 64 2nd hr, td 3367 ft.

Van Buren County: Bloomingdale—C. C. Goff's Galicki 2, ne sw sw 12-1s-14w, Traverse 1279-80 ft, flow 150 bbls after acid, td 1280 ft.

WILDCAT STARTS

Clare County—Freeman Oil Co.'s Liewald 1, sw sw ne 16-18n-5w, dr.

Ingham County—Fisher-McCall's Rogers 1, sw se sw 1-2n-1e, dr.

Eastern States

OHIO
COMPLETIONS

Fairfield County—City Natural, Crooks 1, abnd 2469 ft.

Licking County—D. C. Deem et al, Walcutt 1, 0.12 gas, 2535 ft.

Meigs County—Skinner Co., Molden 2, 0.5 gas, 761 ft.

Monroe County—Barnesville Dev. Co., Peters 2, 0.04 gas, 2045 ft.

Highman et al, Drake 3, 0.02 gas, 1341 ft.

Carlos Luburgh et al, McConnell 1, 20 bbls, 1300 ft.

Noble County—Bob Sprague, Wells 2, abnd 209 ft.

Perry County—Preston Oil, Sunday Creek Coal Co. 207, abnd 3438 ft.

Stark County—Lyons Co., Sickafoose 1, abnd 4830 ft.

Tuscarawas County—Nat. Gas of W. Va., Sweaney 2, 4.5 gas, 4669 ft.

Washington County—Newport Oil Co., Adkins 24, 3 bbls, td 415 ft.

Wayne County—Kemrow Co., Fickes 2, 1.1 gas, 3159 ft.

PENNSYLVANIA
COMPLETIONS

Fayette County—J. H. Cornell, Newman 1, abnd 3255 ft.

Washington County—Mfgrs. Lt. & Ht. Co., Marshall 1, 0.09 gas, 2880 ft.

WEST VIRGINIA
COMPLETIONS

Calhoun County—Creed Yoak et al, King 1, 0.02 gas, 2350 ft.

Clay County—Pitts. & W. Va. Gas Co., Elk River Coal Land Co., 2.97 gas, 1913 ft.

Jackson County—United Fuel Gas Co., Bailey 5073, 3.2 gas, 5068 ft.

Spartan Gas Co., Thomas heirs 1, 6.56 gas, 5065 ft.

Hope Natural Gas, Pfost 8585, 6.47 gas, 5251 ft.

United Carbon Co., Presley 2, 14.59 gas, 5122 ft.

Columbia Carbon Co., Patterson 1, 5.74 gas, 5178 ft.

Lincoln County—Mary Lou Gas Co., Stewart & Hager 1, 0.01 gas, 4327 ft.

Logan County—So. Penn Nat. Gas Co., Yawkey-Freeman 68, 0.19 gas, 2000 ft.

Tyler County—G. R. Kerns et al, Kerns & Eddy 1, 8 bbls, 2150 ft.

W. B. WHENTHOFF has been appointed manager of the new office opened April 1 at Houston by Tube-Turns, Louisville, Kentucky. New offices are maintained in the Commerce building. At the same time, the company announced appointment of W. E. Geiser as district manager of the Philadelphia office.

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■ Want small portable rotary capable of 500' 6" hole, under $1000.00, also small swivel, hose. 4 x 5 or 4 x 6 pump, reply Box 254, Powell, Wyoming.

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Regular advertisements for this special section, set in type this size without border, take a flat rate of 7 cents per word for the first insertion and 5 cents per word for each subsequent insertion of the same copy. Display advertisements for this section (set with ruled border) are $5.00 per inch and limited to not more than two inches an insertion. Remittance should accompany copy which should reach us Monday preceding publication.

THE OIL WEEKLY

P. O. Box 2608 Houston, Texas

Men in the Industry's News

EUGENE McAULIFFE, president of the American Institute of Mining and Metallurgical Engineers, was honored at a luncheon meeting of the Gulf Coast Section of AIME institute at Houston, April 13.

McAuliffe, the fifty-ninth president of the institute, has had wide experience in the railroad and fuel industries. His experience as a coal-mining executive began in 1908 when he was made president of the Brazil Block Coal Company. He has held several executive positions in mining companies.

During the first World War, McAuliffe acted as manager of the fuel conservation section of the United States Railroad Administration. In 1923 he served as informal adviser to the United States Coal Commission.

As an author he is responsible for "Railway Fuel," published in 1927, and for "Romance and Tragedy of Coal," issued in 1931. He was elected a director of AIME in 1929.

COMMISSIONER JERRY SADLER and Dr. F. V. L. Patten, chief supervisor of oil and gas for the Texas Railroad Commission, will be Texas' representatives at the National Conference of Petroleum Regulatory Authorities April 14 in Washington.

CLYDE BEEBE, scout for Shell Oil Company, Wichita, expects to leave for Army service in the near future.

E. H. LEEMAN, Shell Oil Company, Tonkawa, has transferred to Pampa where he will continue in the engineering department.

EARL BROWNHILL of Brownhill Drilling Mud Service presented a paper on "A General Discussion of Drilling Mud Problems" before the Houston Geological Society April 9. At the April 16 meeting, a paper will be presented on "Variations of Types of Crude Oils With Depth in Different Formations in the Texas Gulf Coast."

ROBERT V. NEW has been elected president of Continental Development Corporation, which has announced a program for expansion of exploration and production activities. The corporation has drilled and now operates a number of wells in the Wilmington, California, field. New will retain his position as vice president of Continental Corporation and as a director of both corporations

H. G. TEXTER, who has been connected with the Tulsa Office of Spang, Chalfant, Inc., for many years as sales engineer, has been transferred to the Ambridge, Pennsylvania, plant of the company. He will be engaged in engineering work in connection with the company's war production program.

DR. V. L. MALEEV, professor of mechanical engineering, Oklahoma A. & M. College, addressed Engineers Club of Tulsa on new data relating to end products resulting from firing of charges in internal combustion engines.

JOHN FERGUSON, president of Tulsa Geological Society and J. W. Merritt, W. B. Wilson, G. B. Westby, R. S. Tarr and Jesse Vernon, have formed a committee to assist geologists seeking to enter war service.

CLARK B. MILLISON spoke before Tulsa Geological Society on "Recent Developments in Illinois Oil Fields."

J. W. STOKER, Sinclair Prairie Oil Company superintendent of production in western Osage fields is now located at Drumright.

C. C. BROOKS, Seismograph Service Corporation, addressed Shawnee Geological Society on "Life in Java and Bali," areas familiar to Brooks as a result of survey of prospects in those districts.

GILBERTO DELGADO has become an engineer for Colombian Ministry of Petroleum at Bogota. He is one of ten Colombian engineers who were sent to the United States for graduate study in petroleum technology. Following graduation from the University of Oklahoma Delgado joined The Carter Oil Company for field training, and returned to Colombia in January.

JOHN GAYNOR gave a talk on the general outlook for oil production in Ecuador at a meeting April 6 of the Houston Chapter of Nomads. Movies of oil concessions in that country were shown.

DANA M. SECOR, West Texas geologist, was drafted to serve on the city council of Midland, Texas, through a write-in campaign conducted in his behalf on the eve of the city election.

WILLIAM J. CLAY, vice president of Clay Brothers Drilling Company, has announced removal of headquarters from Wichita, Kansas, to Fort Worth, where a branch office has been maintained the past year under his direction. An operating office will be retained at Wichita, with R. G. Clay, president, in charge.

P. O. TETER, East Texas field superintendent for Empire Pipe Line Company, has been transferred to Bartlesville, Oklahoma, headquarters to become assistant general superintendent.

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W. D. TAYLOR, 58, operator in North Texas and Oklahoma, was fatally injured April 3 when his car door opened accidently while backing out of the garage at his Wichita Falls residence.

A. W. HERRINGTON, president of Marmon-Herrington Company, Indianapolis, has been appointed technical advisor and assistant to Colonel Louis Johnson, first United States Minister to India.

R. W. McCLENAHAN, manager of the Philadelphia factory of American Meter Company, has been granted leave of absence to join the United States Army as a major.

C. E. NEEDHAM has resigned his position as president of the New Mexico School of Mines and director of the New Mexico Bureau of Mines and Mineral Resources. He has held the position since January, 1939.

AL BUCHANAN has been appointed chairman of the arrangements committee for the annual South Texas Oil Men's meeting at San Antonio April 17. The meeting, sponsored by the South Texas Chamber of Commerce, is the fifth to be held.

GEORGE WILSON, head of Standard Oil Company of Louisiana's legal staff, has joined the administrative staff of the OPC in Washington.

CURTIS HICKS has joined the geological department of Phillips Petroleum Company at Oklahoma City. He formerly was with Kenneth Ellison as geologist and draftsman.

K. R. MARCH, Fort Worth operator, has returned to duty with the Army Air Corps as a major at San Antonio, Texas. He served in the air forces in England in World War I.

CHARLES L. RABE has been promoted to district engineer for Shell Oil Company at Hobbs, New Mexico. He formerly was junior engineer at Denver City, Texas.

WILLARD MILLER, chief geologist for Ramsey Petroleum Corporation, Oklahoma City, has been studying methods of protecting oil properties against bombings and sabotage in California. He recently returned to Oklahoma City.

REGINALD E. WATSON is now with Standard Oil Development Company in New York City. He recently returned from Venezuela where he was with Lago Petroleum Corporation.

S. L. BATES has been appointed sales manager of the Buffalo, New York, district. E. C. Bowers, president, Wickwire Spencer Steel Company, 500 Fifth Avenue, New York, has announced. Bates came with Wickwire in 1936 and has been in the Ohio territory since that time.

Prior to joining Wickwire Spencer, he was secretary and assistant treasurer

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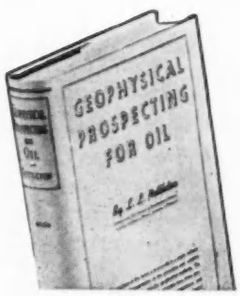

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By L. L. NETTLETON
Geophysicist, Gulf Research Development Company

This book offers a concise introduction in one volume to all four principal methods of geophysical prospecting, covering the theory, apparatus, field work, and calculations of each and emphasizing the practical interpretation of results in the light of the oil prospector's needs. Each method (gravitational, magnetic, seismic and electrical) is treated separately with a complete development of theory and practice, but in a manner to bring out the relations, comparisons, etc., useful to the prospector in his problems of selecting and applying methods and determining the value of results obtained.

The book also includes emphasis on the increasingly important gravimeter, its operation, and reduction and calculation of gravity values.

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Garlock *Plastallic* Packings are compounded to Garlock formulae for various services. Easy to apply. In service, *Plastallic* combines into one homogeneous mass. Photo below shows coil, spiral and ring forms. At right is shown loose or bulk form.

of Beans Spring Company, Massillon, Ohio. He had previously served as purchasing agent of the National Pressed Steel Company.

Since 1918, Bates has been associated directly and indirectly with the steel industry, including Republic Steel Corporation. His experience embraces the production, distribution and management phases of steel and affiliated industries. He will be located at the company's Buffalo offices in the Rand Building.

CHARLES P. GILIKSON, former factory representative at Minneapolis for American-Marietta Company, has been named assistant to Roland G. Maus, sales manager. He joined the industrial paint manufacturing firm four years ago, coming from Minnesota Mining & Manufacturing Company. He will make his headquarters at the company's main office in Chicago.

Squeaks from the Bull Wheel

Foiled by a Purl

It looked like the beginnings of a fine espionage case, with a Mata Hari angle, when Seattle police arrested an attractive brunette for a minor law infraction.

She carried a little black book with such mysterious inscriptions as: " K 1, P 2, CO 8, K 5, YO, K 3, P 2, DECR. 6, K 5, INC. 4."

Neither police nor federal agents were able to "decode" the inscriptions. Finally they called in the suspect and began to question her. She giggled.

"Oh, that," she replied. "Those are my knitting instructions. They mean knit one stitch, purl two, cast on eight, knit five, yarn over, knit three, purl two, decrease six, knit five, increase four."

Rebuff

"I don't need none."

"How do you know? I might be selling grammars."

One Answer

"What is the main crop of Iowa?"

"I don't know."

"What do they put in cribs?"

"Babies."

Identified

"Papa, what is the person called who brings you in contact with the spirit world?"

"A bartender, my son."

Anticipation

"I wish you had told me this morning that you were going to have ice cream for dinner!"

"Why, dear, what difference would it have made?"

"Oh, lots! I could have expected it all day, then!"

Outline

The class had been asked to present an outline of a hunting trip, from which they could at a later date write a complete story.

Johnny turned in this outline:

Lion Hunting Trip

A. Two hunters and a lion.

B. One hunter and a lion.

C. Lion.

Appeasing Father

"Thomas, I'm afraid I'll have to tell your father you've been a bad little boy."

"When?"

"After dinner."

"Well, mother, give him a real good dinner. You might do that much for me."

Reasonable

"Papa, what's an average?"

"Well, er- my son, what do you think it is?"

"I guess it's the bottom of a hen's nest."

"Great Scott! What do you mean?"

"Well, every time I read about a wonderful hen, it says she laid so many eggs on an average."

Foiled Again

Hitler, after feverishly studying a map of the English Channel, asked his secretary to have a medium put him in touch with the spirit of Moses.

"I am Der Fuehrer of Germany," announced Hitler after communication was established. "I want to know how you made the waters of the Red Sea part and fall back."

"I struck them with my rod," came from Moses' spirit.

"Where is that rod now?"

"In the British Museum!"

* * *

So Adolph ordered a glass-bottomed boat for Benito's birthday, so Benito can review his navy.

If you have any doubts regarding their performance and long life . . . check the records of Grizzly Rotary Brake Blocks on any well, in any field . . . Grizzly performance *is* outstanding, regardless of well or drilling conditions, and is a good measure of value with which to make comparisons . . . *Be sure!* You can't go wrong on brake lining if you check actual performance records at the rig.

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Notes for the Equipment Buyer and User

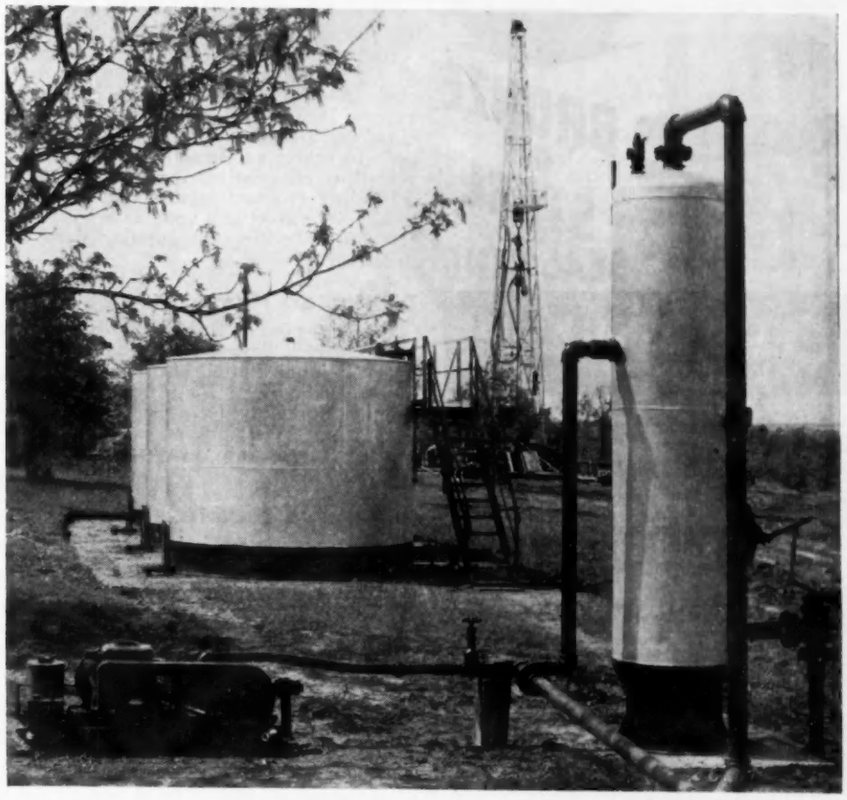
Engine

INTERNATIONAL HARVESTER COMPANY

International Harvester Company, 180 North Michigan Avenue, Chicago, has issued a pamphlet describing a new small engine, International Type LB.

The small engines with improved cylinder head design provide low cost, dependable power for many jobs in industry. They assure all-weather service with easy starting in cold weather and automatic lubrication to all moving parts.

Small overall dimensions and light weight make them easy to install and move from place to place as the occasion may require.

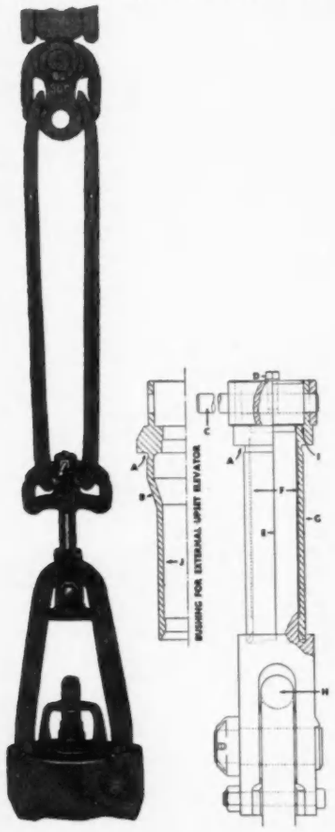


International Harvester Company's Type LB engine operating a rotary pump and oil treating recycling unit on a lease near Seminole, Oklahoma.

Drilling Hooks

BYRON JACKSON COMPANY

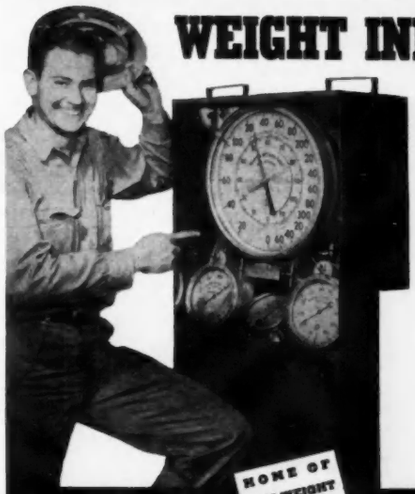
Byron Jackson Company, Los Angeles, has announced that, for certain purposes, the well known BJ Triplex Hooks are now furnished on order with a Duplex body which attaches in place of the usual Triplex, or 3-hook body.



BJ Drilling Hook

The left portion of illustration shows the Duplex Body used in connection with the new BJ swivel bail adapter to provide a quick, safe means of setting the kelly and swivel into the rat hole when the drilling string is going in or coming out of the hole, or when casing is being run. In the line drawing (with the swivel bail H in position) the elevator is closed under a shoulder I on a solid shank when small diameter drill pipe is being used, or under the shoulder A of a bushing (split at E) when larger diameter drill pipe is in service.

By selecting the proper split bushing, each BJ swivel adapter will handle sev-



WEIGHT INDICATOR POINTS

THERE ARE TIMES when spending money for certain items of equipment is the best way to **save** money.

Right now, for instance, weight indicators and gauges are a better buy than ever . . . because these Martin-Decker instruments—properly used—save equipment wear and tear, **and cut the cost per foot of hole!**

Ample proof of that is from the Martin-Decker "Sealtite" owner who reported 100 feet **more** hole per bit in certain formations with this instrument, than with the obsolete equipment he formerly used!

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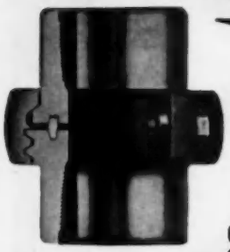
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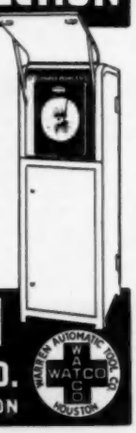
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eral drill pipe sizes; for example: when the shank diameter F is 3½ inches the bushing G can be 4½ inches and the bushing at J will handle 4½-inch external upset drill pipe.

One end of pin C holds the bushing retaining ring in position, while the other end of this pin protrudes sufficiently to prevent rotation of the swivel in the elevator. A cap screw and lock washer D retain pin C in position.

When the bushing for external upset drill pipe is being used, the load is carried under the shoulder A. The diameter of the bushing at B (being less than the bore of the elevator) serves only to center the bushing in the elevator, thus eliminating the possibility of a bending moment in the Adapter.

The BJ swivel bail adapter is made in sizes for handling all popular sizes of drill pipe.

Distributors Named

Weatherford Spring Company, Weatherford, Texas, has announced that The National Supply Company, State Sales & Service, Inc., and Republic Supply Company have been added as West Coast distributors for Weatherford scratchers and Weatherford casing guides.

Detachable Jackbits

Ingersoll-Rand Company, Phillipsburg, New Jersey, has issued a new bulletin entitled, "How Jackbits Reduce Rock Drilling Costs." Containing more than 50 illustrations, a table shows the types of jackbits recommended for different kinds of work and cost data.

It shows how, on numerous hardrock jobs, the detachable jackbits and I-R reconditioning equipment have raised drilling speed while lowering both drilling and steel handling expense.

Asphalt Board

Keystone Asphalt Products Company, 43 E. Ohio Street, Chicago, has issued a new data sheet on its asphalt board, giving information on use of the product in conventional and special building applications, and listing properties making it desirable for unusual applications. Properties described include the board's resistance to water, acids, mildew, vapors and termites.

Relief Valves

Reliance Regulator Corporation, Alhambra, California, has issued bulletin 49 on new relief valves, differential valves, back-pressure valves and pressure limiting valves. Ten types of valves are described, covering a range of sizes from ¾- to 10-inch, for service with either liquid or gas, with a pressure limit up to 225 psi.

Pumping

Caterpillar Tractor Company, Peoria, Illinois, has issued an 8-page booklet. "Caterpillar" Power for Pipeline Pumping. This freely illustrated booklet bears out its title with action pictures of various "Caterpillar" Diesel engine installations to accompany the text.

Tramrail

The Cleveland Crane & Engineering Company, Wickliffe, Ohio, has issued booklet No. 2008-A on "Cleveland Tramrail Engineering and Application Data," covering subject of overhead materials handling.

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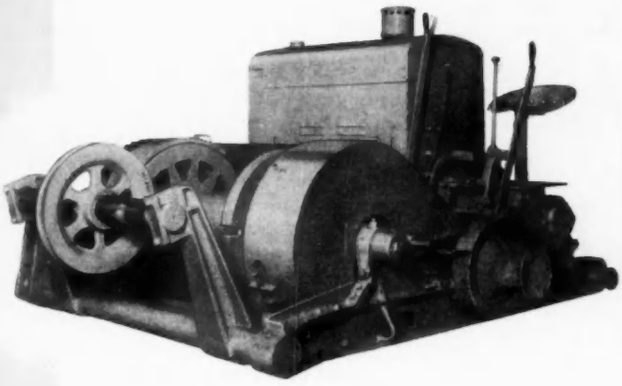
See the New Feature
USED EQUIPMENT FORUM
Page 66 of this issue of
THE OIL WEEKLY
Because of the scarcity of certain types of new equipment and the fact that some concerns may have a surplus of certain items and a serious shortage of others, this feature has been inaugurated as an aid in locating needed used equipment or in disposing of surpluses that may be needed by other operators.

Tear this out for your file

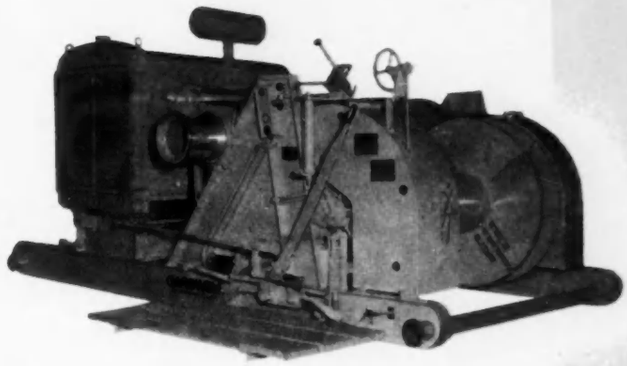
YOU CAN HANDLE MORE JOBS WITH THESE DOUBLE-DUTY HOISTS



MODEL H OR K SINGLE DRUM HOIST

Both cable tool and rotary workover jobs can be handled with this skid type hoist. The spudding and rotary assemblies are interchangeable in the field. The skid type hoist and separate truck save on initial investment and increase the usefulness of each unit.

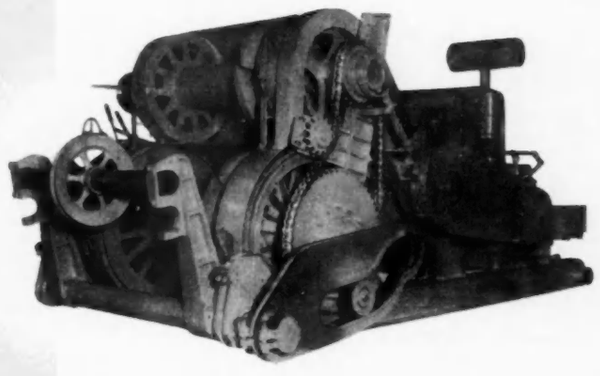
Two sizes of this type hoist are available for well servicing and rotary workover jobs to 6,500 feet and cable tool workover jobs to 4,000 feet. A smaller hoist is available for well servicing to 3,000 feet.



MODEL L OR S SINGLE DRUM HOIST

This fast, powerful hoist can be used for deep well rod and tubing servicing and rotary workover jobs. Plenty of power can be used on this skid type hoist because the size of the engine is not limited by the torque capacity of the truck axle, as is the truck power take-off arrangement. The dual safety braking system has a single adjustment. Positive jaw clutches and SKF bearings insure a free-rolling drum. Every wearing part throughout is heat-treated for wear resistance.

Two sizes are available for well servicing and rotary workover jobs to 12,000 feet.



MODEL U, H, K OR R DOUBLE DRUM HOIST

The spudding assembly on this double drum hoist is interchangeable with a rotary table drive assembly. This makes a combination rig that can be changed over in the field in three to four hours for either cable tool or rotary workover jobs. Friction clutches on the countershaft for driving the drums enable the operator to lift the string of cable tools without stopping the spudder or lift the drill pipe the kelly length without stopping the rotary table.

Models K and R are available with walking beam assemblies for cable tool jobs and pumping potentials.

Four sizes are available for well servicing and rotary workover jobs to 10,000 feet and cable tool workover jobs to 7,500 feet.

SERVICING AND WORKOVER MASTS

"Cardwell" single and double leg masts are field engineered to fit your jobs. These masts will save you time and money by the speed of their erection, trouble-free operation and rugged construction. Demountable sheaves are of heat-treated manganese alloy steel and mounted on shielded ball and roller bearings. Mast lower and upper sections are made of extra heavy steel casing.

Masts are mounted on the hoist frame or subframe and may be quickly detached for operations under a derrick. Telescoping pipe masts are available in five sizes: 48- and 55-foot single leg and 55-, 65- and 87-foot double leg. Masts are available for all "Cardwell" servicing hoists and drilling rigs. Two sizes of mast trailers are also available for transporting these masts.

CARDWELL ALL STEEL
BIG W TRADE MARK PAT. OFFICE
THIS TRADE MARK INSURES HIGHEST QUALITY AT LOWEST PRICE

CARDWELL MFG. CO. INC.

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"CARDWELL" RIGS ARE STRONGER, WEAR LONGER AND WEIGH LESS

Any JENSEN installation (this one happens to be near Bradford, Pa.) becomes more valuable to us as time proves its smooth, quiet, stubborn dependability.

So You Want to MAKE MORE MONEY!

(Hypothesis for Producers)

Let's take the hypothesis that any well can be more profitable and satisfactory when JENSEN equipped. If it's true, you want to know it.

Consider the fact, then, that JENSEN UNITS are made by the oldest and largest exclusive manufacturer of pumping equipment in the business.

Which can mean but one thing: JENSEN JACKS have made good with producers everywhere. Nothing short of **REPEAT** orders can build a business like ours.

You'll have to go on from here, because every field presents different opportunities for the application of JENSEN economy, efficiency and dependability. So contact your JENSEN dealer, or wire us at Coffeyville.

JENSEN BROTHERS MANUFACTURING CO.

. . . Coffeyville, Kansas, U.S.A. . . .

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LOOKING AHEAD

. . . with the Editor

Gas Drive Prolongs Producing Life of Field

AN INTERESTING gas-drive system which has been in operation for 12 years with outstanding success is responsible for the large recovery of oil produced from the old Haynesville field of North Louisiana. The pioneer system represents an early adoption of secondary recovery methods, and by virtue of successful performance over a 12-year period, the field still produces nearly one million barrels of oil annually, with expectancy of several more years of economic operation.

The large Haynesville field was discovered in 1921, and, after original flush production had terminated, daily recovery and bottom-hole pressures declined rapidly. With curves showing rate of production decline indicating life of the field to be limited, plans were formulated to inject gas into the formation to recover large quantities of oil trapped in the reservoir. The system was completed and placed in operation in 1930, with injection gas received through a large line from Cotton Valley 22 miles distant.

Decline of production immediately leveled, and at present 215 wells are still producing in the field, although early estimates predicted that all wells would be abandoned by 1932. Based on estimates made from present production records, engineers figure that parts of the field will produce economically for another 5 years, with probability of producing 2 or 3 million barrels during that period.

A description of the injection system, which will add approximately 15 years to the life of the Haynesville field, will be published in an early issue of THE OIL WEEKLY, and will include graphs and illustrations depicting efficiency and economy of the installation.

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